

DOCUMENT RESUME

ED 242 507

SE 044 131

TITLE Geometry +: Climbing the Hills of Math Skills.
California Demonstration Mathematics Program.

INSTITUTION Ontario-Montclair School District, Ontario, Calif.

PUB DATE [81]

NOTE 199p.; Prepared at Hillview Junior High School. For other program materials and additional Basic Skill Levels, see SE 044 126-132. Several pages may not reproduce well.

PUB TYPE Guides - Classroom Use - Materials (For Learner) (051)

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IDENTIFIERS California Demonstration Program in Mathematics; Perimeter (Geometry); PF Project

ABSTRACT

Seven sequential Basic Skill Levels (levels Q, QA, R, S, T, U, and V) of a self-paced, individualized mathematics program designed to improve the achievement of junior high school students are presented in this student workbook. Each level includes a pretest, five to 14 lessons, quizzes (checkpoints) after each fourth lesson, a posttest, and a level review worksheet. Students must successfully complete the level they are on before proceeding to the next. The levels presented in this workbook are: (1) informal geometry; (2) informal geometry (continued); (3) similar figures; (4) measurement--English system; (5) measurement--metric system; (6) area and perimeter; and (7) volume. (DC)

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ED242507

Climbing the Hills of Math Skills



CALIFORNIA
DEMONSTRATION
MATHEMATICS PROGRAM

Geometry +

Hillview Junior High
Pittsburg Unified School District
Pittsburg, California

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SE044131

TABLE OF CONTENTS

HILLVIEW JR. HIGH CALIFORNIA MATH DEMONSTRATION PROGRAM

GEOMETRY +

LEVEL Q	Informal Geometry
LEVEL QA	Informal Geometry
LEVEL R	Similar Figures
LEVEL S	Measurement - English System
LEVEL T	Measurement - Metric System
LEVEL U	Area and Perimeter
LEVEL V	Volume

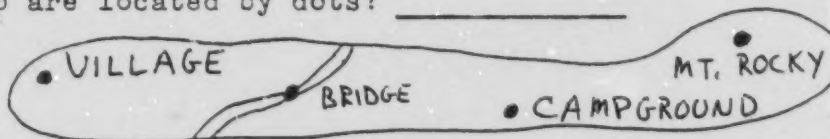
(Each Level consists of a Pretest, Lessons,
Checkpoints, Posttests and Level Review)

POINTS Q-1

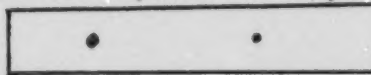
Name _____ Period _____ Date _____

Objective: You will be able to 1) locate and name points on a number line 2) draw a model of a point, 3) locate and name a point between two given points.

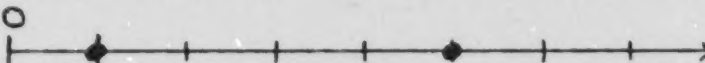
1. Dots are sometimes used to show places on a map. How many places on this map are located by dots? _____



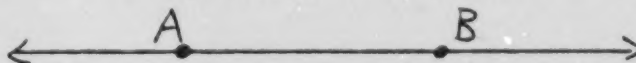
2. Dots are also used to show a place or a point on a piece of paper. Circle the dots in the diagram.



3. Dots may also be used to show the place of a point on the number line. How many points are represented by dots on the number line below? _____



4. Dots or locations of points on a line are named with capital letters. What are the names of the two points on the line below? _____



5. Draw three more points on the line below between points A and B. Label them X, Y, and Z.



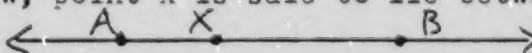
Of course, the dots you draw to show where points are, are not actually points; the dots are only pictures or models of points. Points do not have size; they are only ideas.

Some dots are better pictures of points than others. A small dot is a better picture of a point than a large dot. Look at these pictures of points.



6. Which dot is the best picture of a point? _____
7. Which dot is the worst picture of a point? _____
8. Do you think that you can really see a point? _____
9. Does the dot you draw to show where a point is have size? _____
10. Do you suppose a point has size? _____

The word "between" is often used to help locate points on a line. On line AB below, point X is said to lie between points A and B.

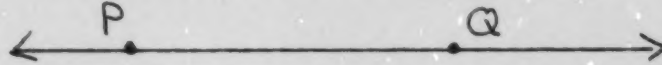


11. Locate and label with the letter Y a point between points A and X.



66 A

12. Locate and label five points between points P and Q.



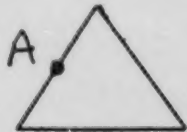
13. How many points do you think could be found between points T and S? _____



14. Can you count all the points that lie between A and B? _____



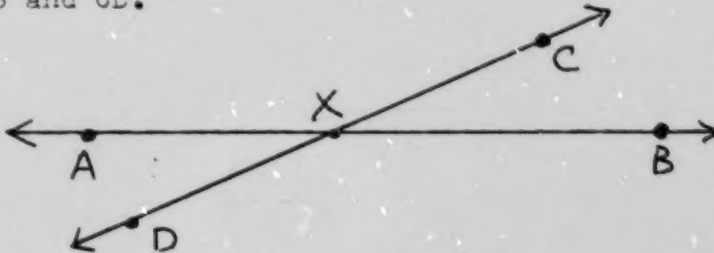
15. Points can also be labeled on other geometric shapes, such as triangles and circles. Locate and label five more points on the triangle and circle below.



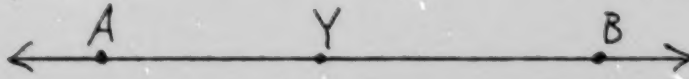
16. The circle below has three points on it. Can you move from point A to point C without going through point B? _____. Draw your path. Is point B between points A and C? _____



17. A point may be on more than one line at a time. Point X is on line AB and CD.



18. In the figure below how many lines could you find that pass through point Y? _____. Draw and label three of them.



Review: A point has no size, it is an idea that is represented by a dot. A point show location, and is named by a capital letter.

LINE SEGMENTS Q-2

Name _____ Period _____ Date _____

Objective: You will be able to draw, name and compare segments.

Here are 2 points named A and B.

A

B

1. Put another point between points A and B.
2. Put 5 more points between A and B.
3. Put 8 more points between A and B.
4. How many points can be placed between A and B? _____
5. How many points are between A and B? _____

The combination of points A and B with all the points between them, is called a line segment. Points A and B are called the end points. A line segment is named by its end points.

A _____ B

This is called line segment AB. Another method of writing segment A is $\overline{AB}$. It can also be written $\overline{BA}$.

Match each line segment with the letter in front of its name as in the example.

- | | | | |
|----------|-----------|---------|--------------------|
| Example: | M _____ N | c _____ | a. $\overline{TV}$ |
| 6. | P _____ Q | _____ | b. $\overline{AR}$ |
| 7. | X _____ Y | _____ | c. $\overline{MN}$ |
| 8. | F _____ M | _____ | d. $\overline{FM}$ |
| 9. | T _____ V | _____ | e. $\overline{XY}$ |
| 10. | A _____ R | _____ | f. $\overline{PQ}$ |

Give two names for each line segment as in the example.

- | | | | |
|----------|-----------|-----------------|-----------------|
| Example: | X _____ Y | $\overline{XY}$ | $\overline{YX}$ |
| 11. | B _____ O | _____ | _____ |
| 12. | M _____ T | _____ | _____ |
| 13. | P _____ E | _____ | _____ |
| 14. | F _____ X | _____ | _____ |
| 15. | O _____ X | _____ | _____ |

Name _____

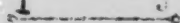
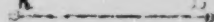
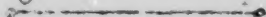
Draw and label a line segment for each name.

Example: $\overline{XY}$ 16. $\overline{MB}$ 17. $\overline{PR}$ 18. $\overline{FB}$ 19. $\overline{WO}$ 20. $\overline{PT}$ 21. $\overline{HG}$

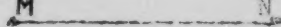
Look at the drawings and complete each sentence.

Example: $\overline{PX}$  $\overline{MR}$  $\overline{PX}$ is shorter than $\overline{MR}$.22. $\overline{AB}$  $\overline{CD}$  $\overline{CD}$ is longer than _____.23. $\overline{EF}$  $\overline{GH}$ 

_____ is longer than _____.

24. $\overline{IJ}$  $\overline{KL}$  $\overline{KL}$ _____ $\overline{IJ}$.25. $\overline{MN}$  $\overline{OP}$  $\overline{MN}$ is the same length as _____.26. $\overline{QR}$  $\overline{ST}$ 

_____ is the same length as _____.

27. $\overline{XY}$  $\overline{MN}$ 

_____ is shorter than _____.

You should be able to name 10 different line segments from the drawing below. (Remember $\overline{AB}$ is the same as $\overline{BA}$) and can only be used once. List them below.



28. _____

29. _____

30. _____

31. _____

32. _____

33. _____

34. _____

35. _____

36. _____

Name _____ Period _____ Date _____

Objective: You will be able to draw and name lines.

Here are two points A and B.



The combination of points A and B with all points between them is called a line segment. Points A and B are end points.

If we extend the line segment past B to point C we have a longer line segment



If we extend the line segment past A to point D. We have even a longer line segment.



If we continue this process forever we will have a line. A line has no end points, and goes in both directions forever.



A line is named by two points on the line. This line is called line AB. Another method of writing line is $\overleftrightarrow{AB}$. It can also be written $\overleftrightarrow{BA}$.

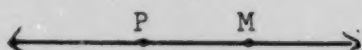
Match each line with its name.

example:



_____ E. $\overleftrightarrow{BM}$

1.



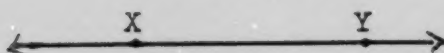
_____ B. $\overleftrightarrow{XL}$

2.



_____ C. $\overleftrightarrow{FT}$

3.



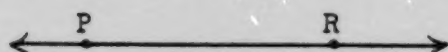
_____ D. $\overleftrightarrow{RP}$

4.



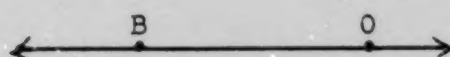
_____ E. $\overleftrightarrow{XA}$

5.



_____ F. $\overleftrightarrow{MD}$

6.



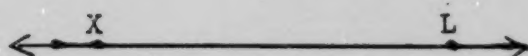
_____ G. $\overleftrightarrow{PM}$

7.



_____ H. $\overleftrightarrow{OB}$

8.

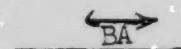
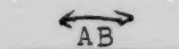
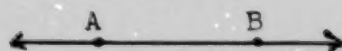


_____ I. $\overleftrightarrow{XY}$

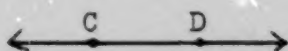
Name _____

Name each line two ways.

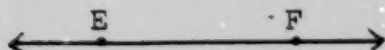
example:



9.



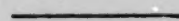
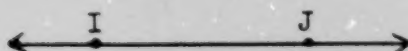
10.



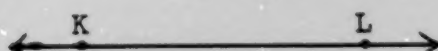
11.



12.

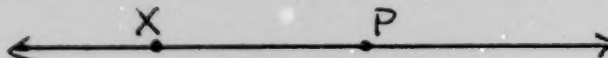


13.



Draw a picture of each line segment named.

example:



14.



15.



16.



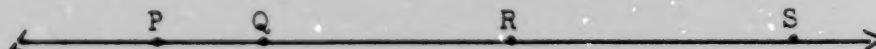
17.



18.



Write six different names for this line. (Any two points on the line can be used to name the line.) Remember $\overleftrightarrow{AB}$ is the same as $\overleftrightarrow{BA}$.



19.



20.



21.



22.



23.

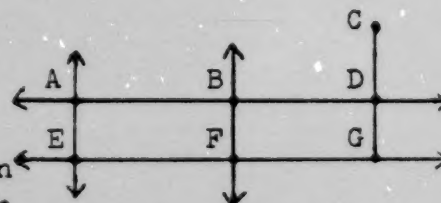


24.



25. List all the lines you can find in the diagram at the right.

26. List all the line segment you can find in the diagram at the right.

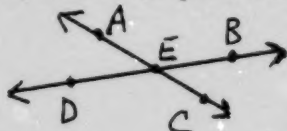


Name _____ Period _____ Date _____

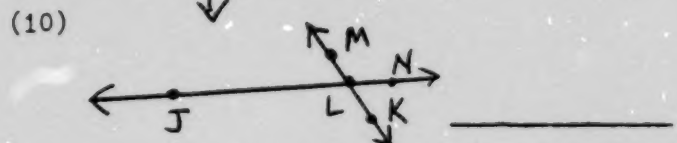
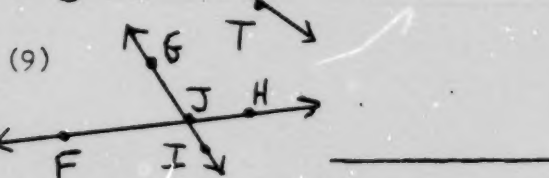
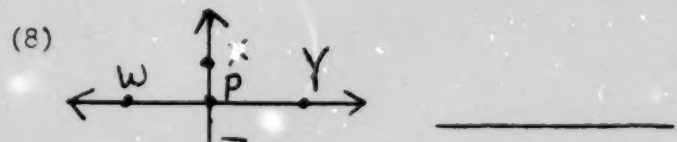
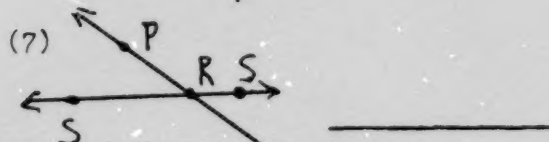
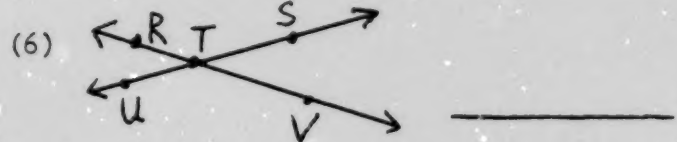
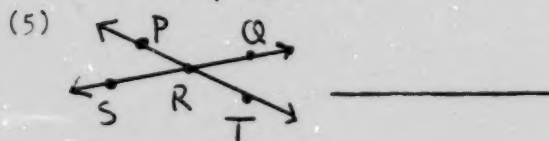
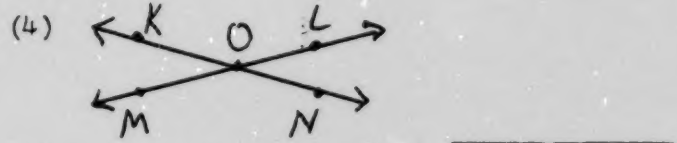
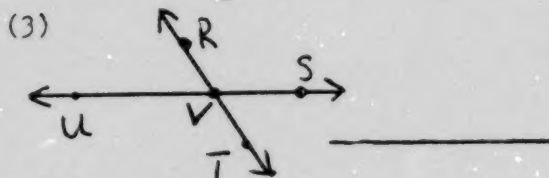
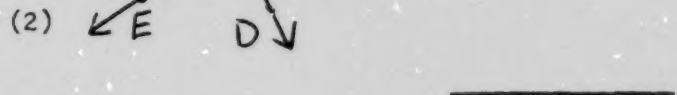
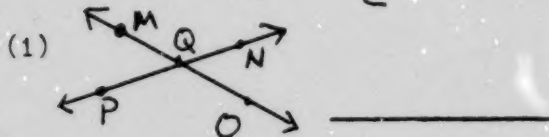
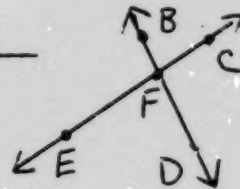
Objectives: You will be able to identify and label intersecting and parallel lines, mark and name points of intersection, and list physical objects in this room which illustrate parallel and intersecting lines.

In each figure, name the point that is contained in both lines.

Example:



Point E



Two lines intersecting lines if they have a common point. Look at the figures below.

Figure 1

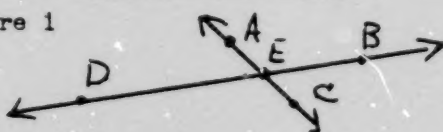
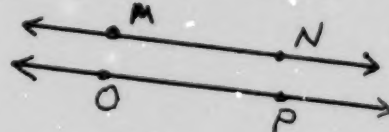


Figure 2



(11) What is the point where the lines in figure a intersect? _____

(12) Do the lines in Figure 2 have a common point? _____

Do they intersect? _____

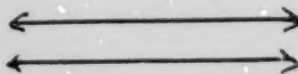
(13) Lines which do not intersect are called parallel lines. Look at the pairs below. Label each pair correctly as parallel or intersecting.



Label each pair of lines as parallel or intersecting.



(17)



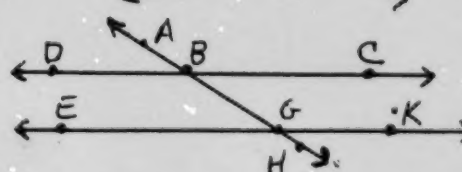
(19)



(21)



(23)



Look at the following figure.

(24) Name the 2 lines that are parallel. _____ & _____

(25) Name the line that intersects both parallel lines. _____

(26) Name two points of intersection. _____ & _____

(27) a) Draw parallel lines $\overleftrightarrow{AB}$ and $\overleftrightarrow{CD}$.

b) Draw $\overleftrightarrow{XY}$ so that it intersects $\overleftrightarrow{AB}$ and $\overleftrightarrow{CD}$.

c) Name the points of intersection O and P.

(28) List five objects in your room that illustrate or use parallel lines. (sides of table tops etc.)

a) _____

b) _____

c) _____

d) _____

d) _____

(29) List five objects in your room that illustrate or use lines that do or would intersect.

a) _____

b) _____

c) _____

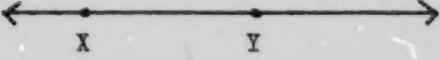
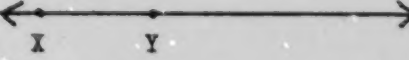
d) _____

e) _____

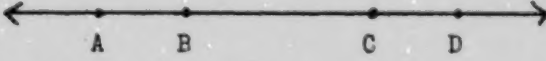
LEVEL Q CHECKPOINT 1-4
Informal Geometry

Name _____
Period _____
Date _____

Draw three more points on the lines below between points X and Y.
Label them A,B,C.

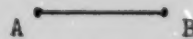
- 1)  2) 
(Q-1)

Name three different line segments using the drawing below.

-  3) _____
4) _____
5) _____
(Q-2)

6) Draw a picture to represent $\overleftrightarrow{AB}$

7) Write the name for this picture.



8) Name this line two different ways.



- a) _____ b) _____
(Q-3)

9) Draw parallel lines AB and CD.

10) Draw lines MN and RS so that they intersect at point P.
(Q-4)

LEVEL Q A-CHECKPOINT 1-4

Name _____

Period _____

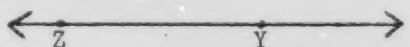
Informal Geometry

Date _____

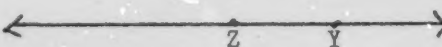
Draw three more points on the lines below between points Z and Y.

Label them C,D,E.

1)

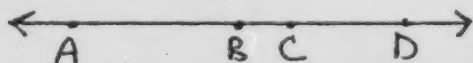


2)



(Q-1)

Name **3** different line segments using the drawing below.



3) _____

4) _____

5) _____

(Q-2)

6)

Draw a picture to represent segment XY

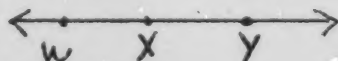
6) _____

7) Write the name for this picture.



7) _____

Name this line two different ways.



8)a) _____

b) _____

(Q-3)

9) Draw parallel lines WX and YZ.

10) Draw lines KL and PQ so that they intersect at point M.

(Q-4)

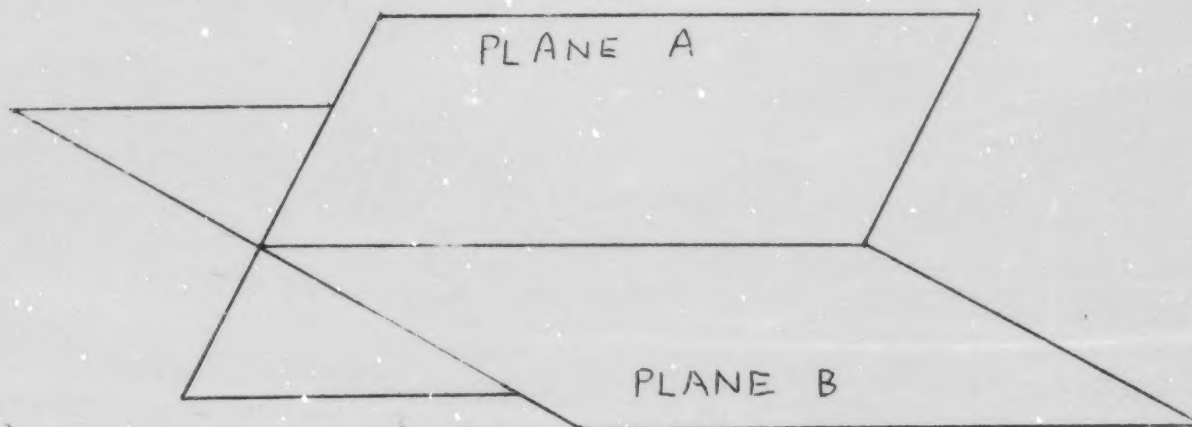
PLANES Q-5

Name _____ Period _____ Date _____

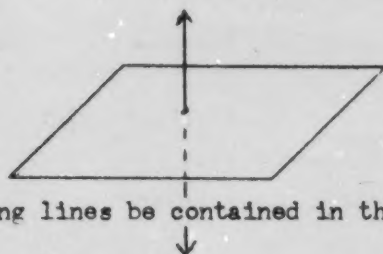
Objectives: You will be able to draw and describe a plane; determine what the intersection of planes and lines form; and determine how many parts space is divided into by one, two and three planes.

Let's do some imagining. Picture this sheet of paper extending in all directions farther than you can see. You would even have to climb on top of it to be able to write on it. This huge sheet of paper could represent a "plane". A plane is a flat surface that extends infinitely far in all directions.

- 1) A _____ is a flat surface that extends infinitely far in all directions.
- 2) Can you ever come to the edge of a plane? _____
- 3) If a plane were upright, could you ever get around or under it? _____
- 4) Planes can be vertical (up and down), horizontal (flat), or at any angle. Can planes be at any angle? _____
- 5) Could you actually draw a plane? _____?
If you answered "no" to problems 2,3 and 5 you are correct.
- 6) In real life, we cannot actually draw a plane; all we can do is represent one. Can you actually draw a plane? _____
- 7) There are many representations of planes in your classroom. The floor represents a horizontal plane. Write three more representations of planes that you see in your classroom. _____, _____, _____
- 8) Name three examples of planes that are not in your classroom. _____, _____, _____
- 9) Look at the picture below. It represents two planes that intersect. Their intersection is a _____.

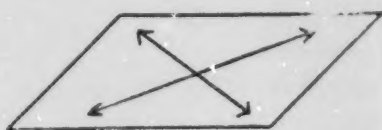


- 10) The intersection of a plane and a line as illustrated below is a _____

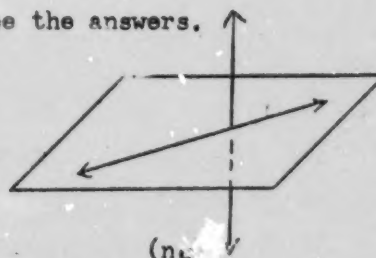


- 11) Can two intersecting lines be contained in the same plane? _____

Look at the two pictures below to help you see the answers.



(yes)



(no)

- 12) A plane separates space into how many parts? _____
- 13) Two intersecting planes separate space into how many parts? _____
- 14) Draw a picture to show how three intersecting planes may divide space into eight parts.

Name _____ Period _____ Date _____

Objective: You will be able to draw and name rays.

Here are two points A and B.

A B

The combination of points A and B with all points between them is called a line segment. Points A and B are end points.

A B

It is named line segment AB or $\overline{AB}$.

If we extend the line segment in both directions forever we have a line. A line has no end points. It is named line AB or $\overleftrightarrow{AB}$.

A B

Now look at the following:

A B

If we have point A as an end point and extend the line segment past point B forever, we have a ray. A ray has one end point.

A B

This ray is named ray AB or $\overrightarrow{AB}$. To name a ray, you use the name of the end point first and the name of only one point on the rest of ray second.

Use the correct symbol to name the following rays.

example:

N M

= $\overrightarrow{MN}$

1.

B C

2.

R S

3.

P R

4.

L M

5.

K L

6.

D E

Name the following rays two ways.

example:

A B C

$\overrightarrow{AB}$

$\overrightarrow{AC}$

7.

X Y Z

8.

O N M

9.

P Q R

Name two rays from the following line.

10.

J K

Name _____

If three or more points of a line or a ray are named, you can name more than one ray.

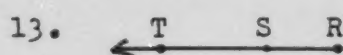
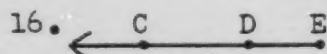
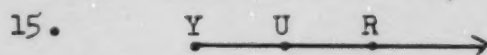
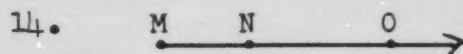
example:



11. $\overrightarrow{AB}$ and $\overrightarrow{AC}$ name the same ray because they contain the same _____.

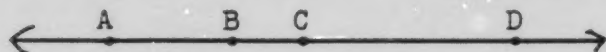
12. $\overrightarrow{BC}$ is a different ray than $\overrightarrow{AC}$ because point A and all points between A and B _____ (are, are not) included in $\overrightarrow{BC}$.

Name two different rays from each figure. (Not different names)

 $\overrightarrow{RS}$ $\overrightarrow{ST}$ 

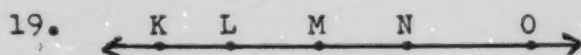
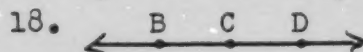
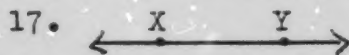
If several points of a line are named, many rays may be named.

example: 4 points are named. Write the names of all the rays which are contained on the line.

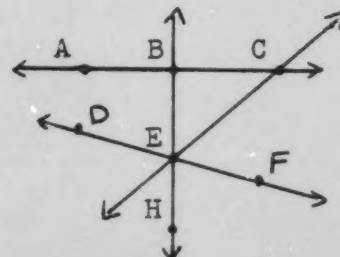


There are six different rays: $\overrightarrow{AB}$ $\overrightarrow{BA}$ $\overrightarrow{BC}$ $\overrightarrow{CB}$ $\overrightarrow{CD}$ $\overrightarrow{DC}$

Name all the possible different rays for each figure.



20. How many rays are there in the diagram at the right? _____
List them. _____



ANGLES Q-7

Name _____ Period _____ Date _____

Objectives: You will be able to recognize an angle and identify and name the vertex and the sides of an angle.

(1) Draw three points which are not in a straight line.

(2) Name the points A, B, and C.

(3) On the same picture, draw $\overrightarrow{AB}$ and $\overrightarrow{AC}$.

The figure you have drawn is called an angle.

An angle is formed by 2 rays with a common end-point.

This end-point of the two rays is the vertex of the angle.

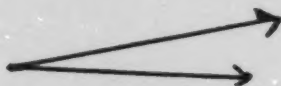
The two rays are called the sides of the angle.

(4) In the angle which you have drawn, point A is called the _____.

(5) $\overrightarrow{AB}$ and $\overrightarrow{AC}$ are the _____ of the angle.

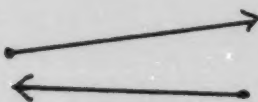
Tell whether or not the figures below are angles. (Answer yes or no.)

Example 1



yes

Example 2



no



Name the vertex and the sides of each angle.

Example:



Vertex: point M

Sides: $\overrightarrow{MP}$ and $\overrightarrow{MD}$

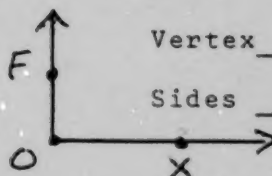
(11)



Vertex: _____

Sides: _____

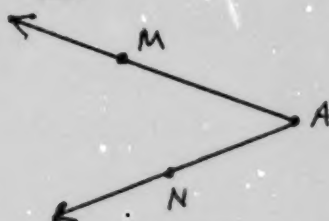
(12)



Vertex _____

Sides _____, _____

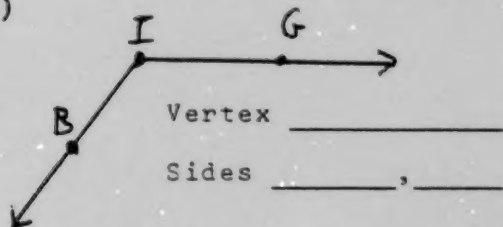
(13)



Vertex: _____

Sides: _____

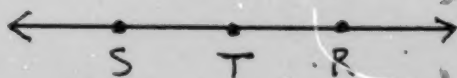
(14)



Vertex _____

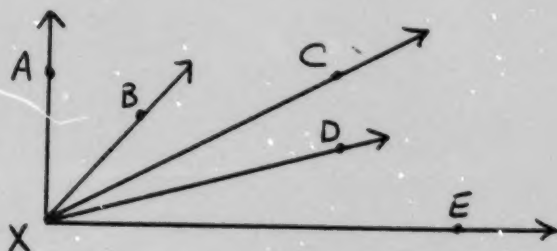
Sides _____, _____

(15)



Vertex: _____

Sides: _____



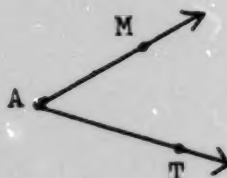
Name all the angles you can find in the diagram above. _____

ANGLES Q-8

Name _____ Period _____ Date _____

Objective: You will be able to name an angle in two ways using 3 letters and draw and label an angle.

An angle is named by using 3 letters for the 3 points

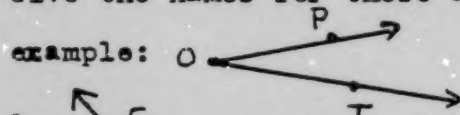


Angle MAT or angle TAM

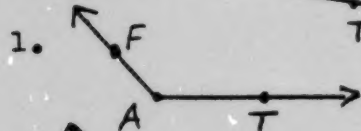
The letter for the vertex must be between the other two letters.

The symbol for angle is: $\angle$

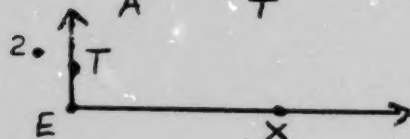
Give the names for these angles. (Use the symbol)



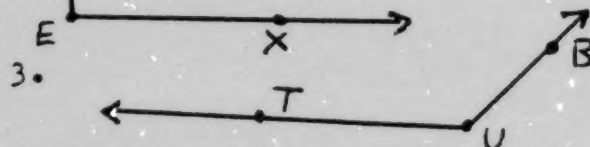
$\angle$ POT or $\angle$ TOP



_____ or _____



_____ or _____



_____ or _____



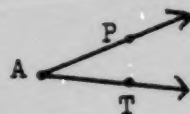
_____ or _____



_____ or _____

Draw and label angles for these names. Put the vertex at the point given.

example: $\angle$ PAT



6. $\angle$ APD .

7. $\angle$ SIX .

8. $\angle$ MAD .

9. $\angle$ XYZ .

Name four angles in this drawing.



10. _____
 11. _____
 12. _____
 13. _____

Give the name and symbol for each figure.

	<u>Name</u>	<u>Symbol</u>
example:		
	line segment	$\overline{AX}$
14.		
15.		
16.		
17.		
18.		

WORD SEARCH

L R U P O T V L Q X V
 K W A N G L E Y R E H
 U W S Y J M R O Y G F
 S G E O M E T R Y P L
 F I E L I N E W C O B
 W T D U H S X H N I R
 L I N E S E G M E N T
 A Z B K R W F K I T G

Word List

angle
 geometry
 line
 line segment
 point
 ray
 side
 vertex

LEVEL Q CHECKPOINT 5-8

Name _____

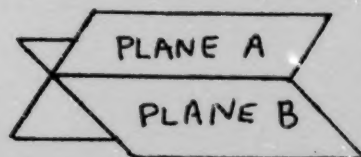
Period _____

Informal Geometry

Date _____

1) Look at the picture below. It represents two planes that intersect.

Their intersection is a _____.



2) A plane separates space into how many parts? _____

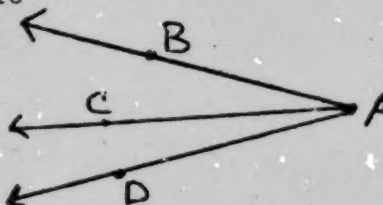
(Q-5)

Name two rays in the following picture

3) _____

4) _____

(Q-6)



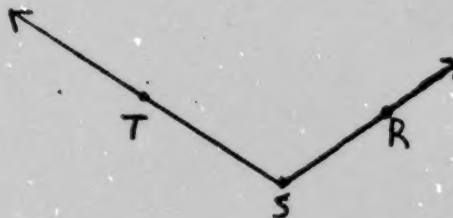
Name the vertex and the sides for the angle given:

5) vertex _____

6) side _____

7) side _____

(Q-7)



Draw the label angles for these names.

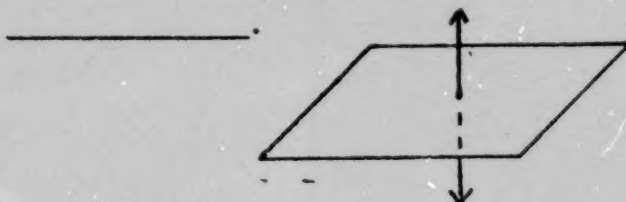
8) $\angle$ MAD

9) $\angle$ XYZ

10) $\angle$ NUF

(Q-8)

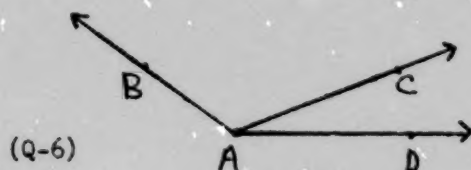
- 1) The intersection of a plane and a line as illustrated below is a



- 2) True or False Two intersecting lines can be contained in the same plane.

(Q-5)

Name two rays in the following picture

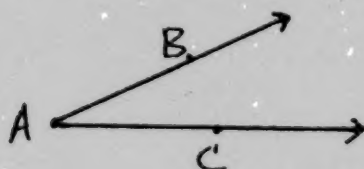


(Q-6)

3) _____

4) _____

Name the vertex and sides for the angle given



(Q-7)

5) vertex _____

6) side _____

7) side _____

Draw and label angles for these names

8) $\angle$ MDA

(Q-8)

9) $\angle$ WAD

10) $\angle$ KLY

TRIANGLES Q-9

Name _____ Period _____ Date _____

Objective: You will be able to recognize a triangle; draw, and label triangle.

(1) Draw 3 points not on the same line. Label them A, B, and C.

(2) Now, put in $\overline{AB}$, $\overline{BC}$, and $\overline{CA}$.

You have just created a triangle.

A triangle is a figure composed of 3, non-collinear points (not in a straight line) connected by 3 line segments.

$\overline{AB}$ is a side of Triangle ABC.

(3) Name the other 2 sides. _____

(4) Point A is a vertex of Triangle ABC.

Name the other 2 vertices. _____

The symbol for triangle is $\triangle$

The triangle above could be called $\triangle ABC$, $\triangle BCA$, or $\triangle CAB$.

(5) Give two other names we could use. _____

Which of these figures are triangles and which are not? Write "triangle" or "not a triangle".

Example: _____



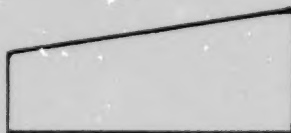
Not a triangle

(6)



_____ (6)

(7)



_____ (7)

(8)



_____ (8)

(9)



_____ (9)

(10)



_____ (10)

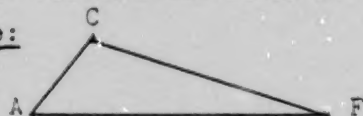
(11)



_____ (11)

Name the vertices and sides of each triangle, and give 2 names for the triangle.

Example:



Vertices: A, C, F

Sides: AC, CF, AF

Names: $\triangle ACF$, $\triangle CAF$

(12)

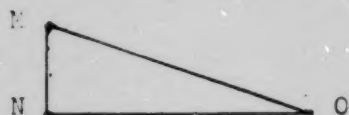


Vertices: _____

Sides: _____

Names: _____

(13)

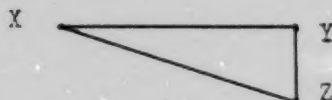


Vertices: _____

Sides: _____

Names: _____

(14)

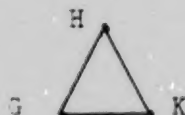


Vertices: _____

Sides: _____

Names: _____

(15)



Vertices: _____

Sides: _____

Names: _____

(16)



Vertices: _____

Sides: _____

Names: _____

Draw and label the triangles whose names are given below.

Example: $\triangle XYZ$



(17) $\triangle PQR$

(18) $\triangle MNC$

(19) $\triangle ZAP$

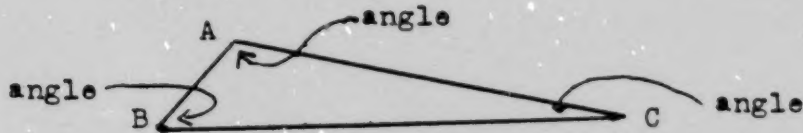
(20) $\triangle LEM$

TRIANGLES Q-10

Name _____ Period _____ Date _____

Objective: You will be able to name angles and sides of triangles.

Do you see that a triangle has 3 angles? _____

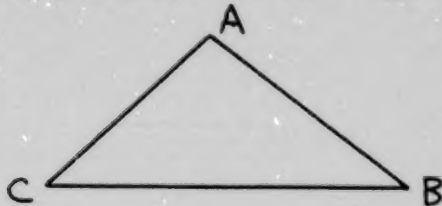


One of the angles of this triangle is $\angle ABC$.

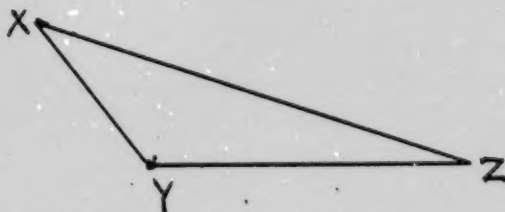
1. Name the other two angles. _____ and _____.

Write the names of the angles of the triangles below.

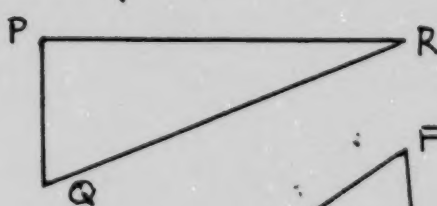
2.



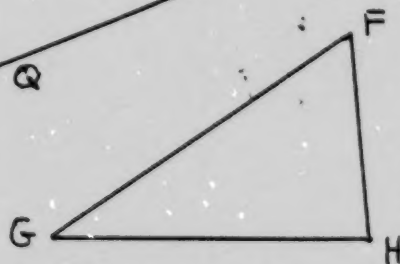
3.



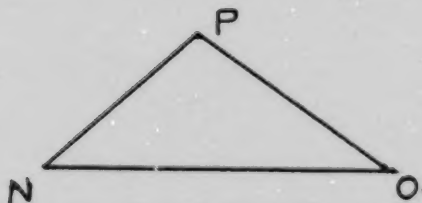
4.



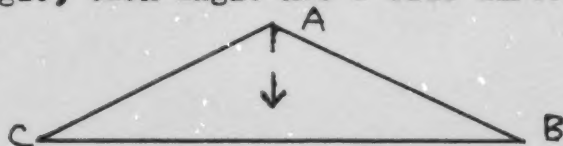
5.



6.



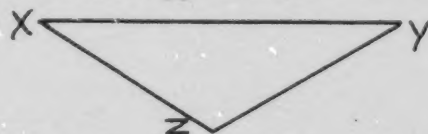
In a triangle, each angle has a side directly across from it



$\overline{BC}$ is the opposite side from $\angle CAB$. $\angle CAB$ is the reference angle.

7. What is the side opposite $\angle ACB$? _____

8. What is the side opposite $\angle ABC$? _____



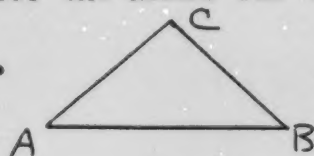
9. What angle is opposite $\overline{XZ}$? _____

10. What side is opposite $\angle ZXY$? _____

11. What is the longest side of triangle XYZ ? _____

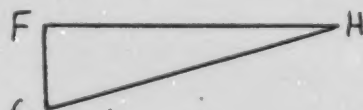
Write the names for the sides of the triangles below

12.



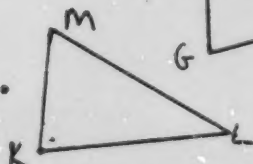
_____, _____, _____

13.



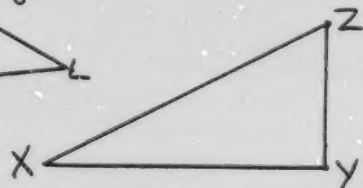
_____, _____, _____

14.



_____, _____, _____

15.



_____, _____, _____

Draw and label a figure for each of the following names.

16. $\overleftrightarrow{AB}$

17. $\angle XPB$

18. Point X

19. $\triangle PZR$

20. $\overline{FT}$

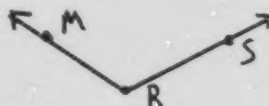
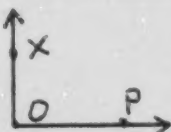
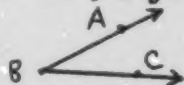
21. $\overrightarrow{GH}$

RIGHT ANGLES & PERPENDICULAR LINES Q-11

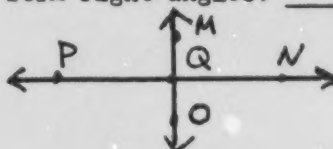
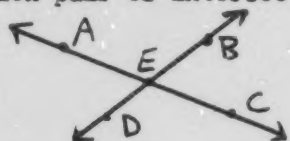
Name _____ Period _____ Date _____

Objective: You will be able to identify and name right angles and perpendicular lines.

Look at the 3 angles below.



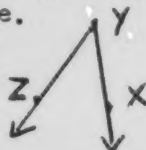
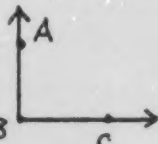
- (1) Which angle looks like a square corner? _____
- (2) When two line segments, rays, or lines meet to form a square corner, the angle is called a right angle. Two lines, line segments, or rays that meet to form a square corner, the angle is called a _____ angle.
- (3) Which pair of intersecting lines form right angles? _____



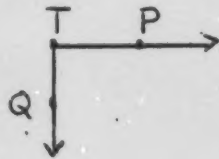
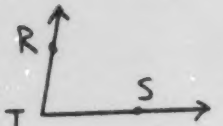
- (4) Name the four right angles: _____

The corners of a sheet of paper are cut square. They form a _____ angle. Use the corner of a sheet of paper to tell which angle of each pair of angles below is a right angle. Name the right angle.

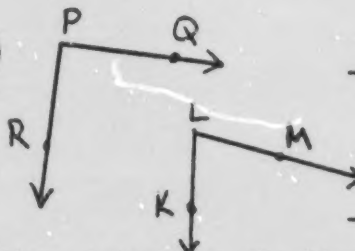
(5)



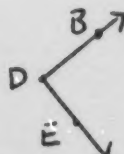
(6)



(8)

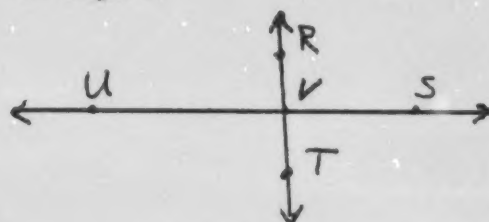
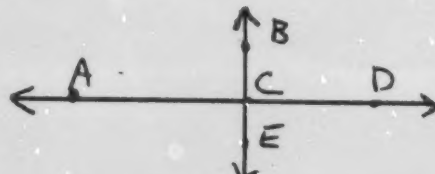


(7)

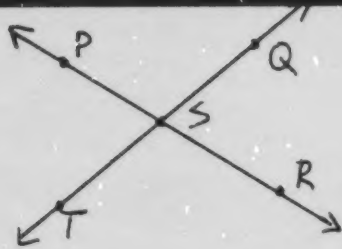


If right angles are formed when two lines intersect, the lines are said to be perpendicular. Write the word Perpendicular beside the intersecting lines below that form right angles. If they do not form right angles, write not perpendicular. You may use the corner of a piece of paper to check the angles.

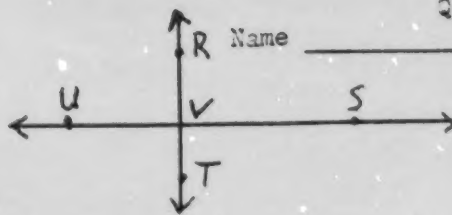
(9)



(10)

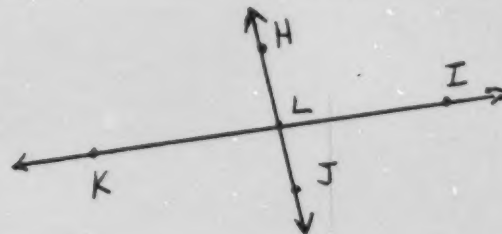


Q-11



Name _____

(11)



NAMING ANGLES (STRAIGHT, ACUTE, OBTUSE) Q-12

Name _____ Period _____ Date _____

Objective: You will be able to draw examples and write the names for straight, acute, and obtuse angles.

We have seen pictures of lines and line segments.



1. Figure 1 shows a (line/line segment).

It is named (symbol) _____. The arrows mean that _____.

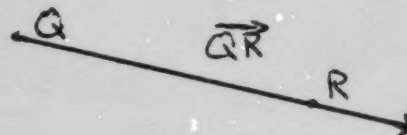
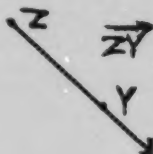
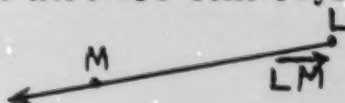
2. Figure 2 is a _____. It is named (symbol) _____.

3. Look at this figure

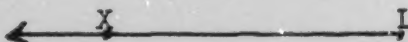


This is called a _____. It is named ray RS, or $\overrightarrow{RS}$. It has one end point, point _____.

4. Here are some rays.

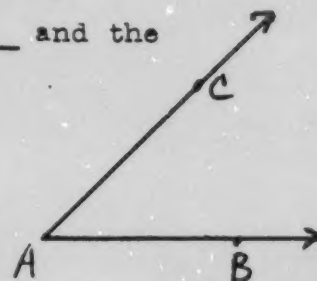


Notice that the _____ of the ray is named first. Is XL (below) the same as LX ? _____



5. In the drawing above the first ray is _____ and the second is _____.

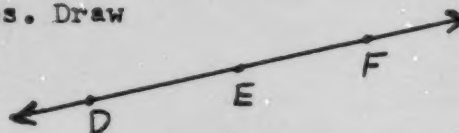
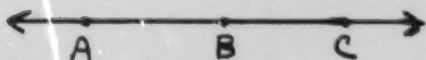
6. Figure 3 shows two rays with the same end point, point _____. They form an angle. An angle is a geometric figure made up of two _____ having a common _____. The angle to the side can be named $\angle CAB$ or _____.



7. Angles like this are called straight angles.

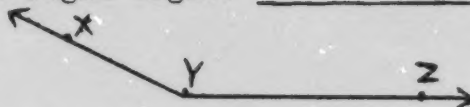
They each measure _____ degrees. Draw and label 2 more straight angles.

Straight angles



8. Straight angles look just like a _____.

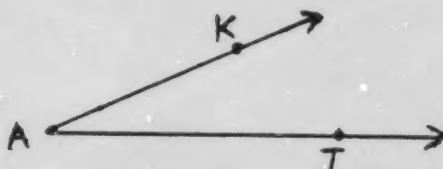
9. Is this angle a right angle? _____ A straight angle? _____



10. The angle in #9, $\angle XYZ$ has a measure larger than 90° , but less than _____. It is called obtuse. An obtuse angle is an angle whose measure is greater than _____ and less than _____.

11. Draw three angles which are obtuse.

12. Is this angle as large as a right angle? _____

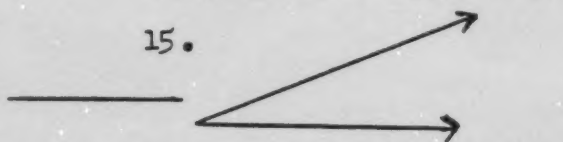


13. $\angle KAT$ has a measure less than 90° , and it is called an acute angle. An _____ angle has a measure greater than 0° less than _____.

14. Draw and label 3 acute angles.

Here are some angles. By each angle write acute or obtuse.

15.



16.



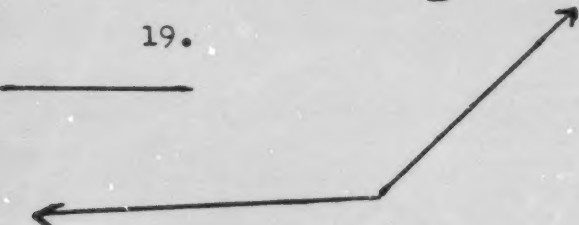
17.



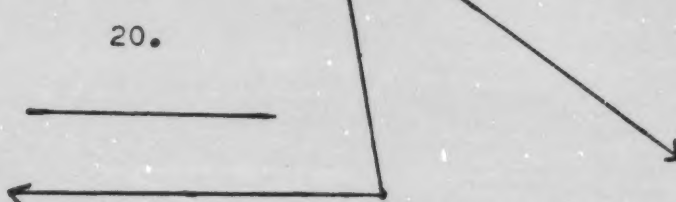
18.



19.



20.



LEVEL Q CHECKPOINT 9-12

Name _____

Period _____

Informal Geometry

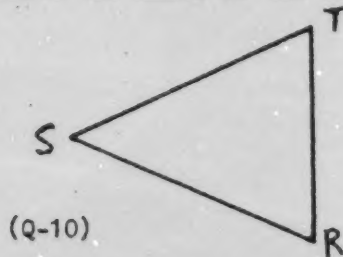
Date _____

Draw a label one triangle whose name is given below

1) $\triangle XYZ$

(Q-9)

Write the names of the angles of the triangle below



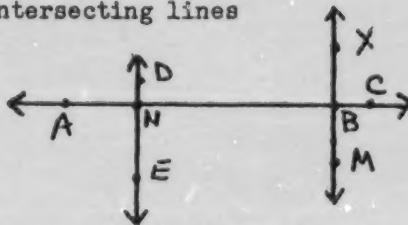
(Q-10)

2) _____

3) _____

4) _____

In the following figure name the two right angles and a pair of intersecting lines



(Q-11)

5) _____

6) _____

7) _____

8) Draw and label an obtuse angle.

9) Draw and label a right angle.

10) Draw and label an acute angle

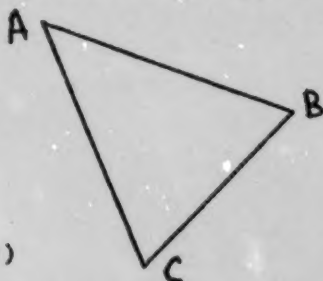
(Q-12)

Draw and label one triangle whose name is given below.

1) $\triangle$ WAT

(Q-9)

Write the names of the angles of the triangle below



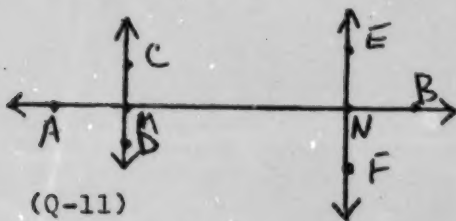
2) _____

3) _____

4) _____

(Q-10)

In the following figure name the two right angles and a pair of intersecting lines



(Q-11)

5) _____

6) _____

7) _____

8) Draw and label an acute angle

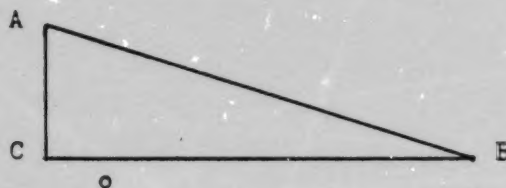
9) Draw and label a right angle

10) Draw and label an obtuse angle

(Q-12)

Name _____ Period _____ Date _____

Objective: You will be able to list the names of the parts of a right triangle.



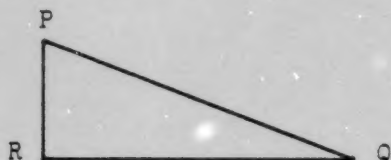
- (1) Measure $\angle C$. _____ (2) Figure ABC is a _____.
- (3) $\angle C$ is a _____ angle.

Figure ABC is a right triangle because it has 1 right angle.

- (4) Any triangle which has one right angle is called a _____.
- (5) $m\angle A + m\angle B + m\angle C =$ _____^o
- (6) $m\angle C =$ _____^o (7) $m\angle A + m\angle B =$ _____^o
- (8) $m\angle A$ ($<$, $>$, 90°) (Circle correct answer.)
- (9) $m\angle B$ ($<$, $>$, 90°) (Circle correct answer.)
- (10) $\angle A$ and $\angle B$ are _____ angles.
- (11) A right triangle has one _____ angle and two _____ angles.

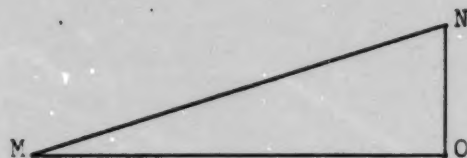
In the triangles below, tell the name of the right angle and the name of the longest side.

Example:



right $\angle$ $\angle PRQ$
 $\overline{PQ}$

(12)



right $\angle$ _____

(13)



right $\angle$ _____

(14)



right $\angle$ _____

Q-13

(15) The longest side of a right triangle is always the side opposite the _____

_____.

The longest side is called the Hypotenuse. The other 2 sides are called legs of the right triangle.

(16) The longest side of a right triangle is called the _____.

(17) The two shorter sides are called _____.

(18) A right triangle has _____ right angle(s).

(19) A right triangle could have _____ obtuse angles.

(20) A right triangle has two _____ angles.

(21) The right angle is the angle opposite the _____.

(22) Try to draw a right triangle with 2 right angles.

SPECIAL TRIANGLES Q-14

Name _____ Period _____ Date _____

Objective: You will be able to identify and name equilateral, isosceles, and scalene triangles.

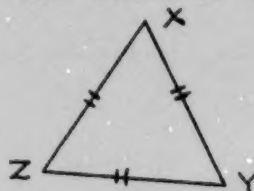
1. Figure XYZ is a _____

Get a metric ruler and measure the sides of the triangle below

2. XY = _____ cm.

3. YZ = _____ cm.

4. XZ = _____ cm.

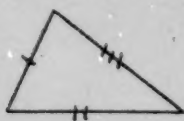


This is a special kind of triangle and is given the name equilateral triangle, because the 3 sides have the same measure. The double slash marks through each side shows that the sides are equal. If the number of slash marks differ then the sides are not equal.

5. Any triangle whose 3 sides are equal in length is called an _____.

Determine which of the following triangles are equilateral. (Write equilateral or not equilateral in the space provided.)

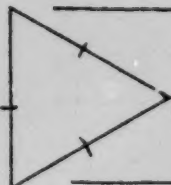
6.



7.



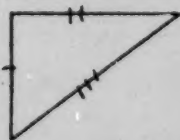
8.



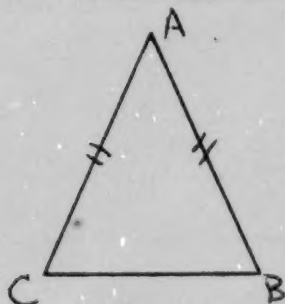
9.



10.



11.



12. Figure ABC is a _____.

Get a metric ruler and measure the 3 sides of the triangle to the left.

13. AC = _____ cm.

14. AB = _____ cm.

15. BC = _____ cm.

You should find that two of the sides are the same length. This is another special triangle and is given the name Isosceles triangle.

16. Any triangle which has two sides of equal length is called an _____.

Determine which of the following triangles are Isosceles. (Write Isosceles or not Isosceles in the space provided.)

17.



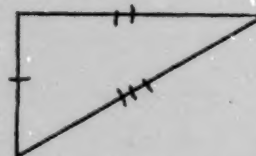
18.



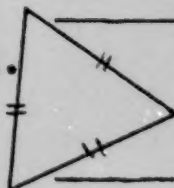
19.



20.



21.



22. The triangle in problem 21 is also an _____ triangle.

(Circle either T or F)

23. All equilateral triangles are isosceles.

T

F

24. All isosceles triangles are equilateral.

T

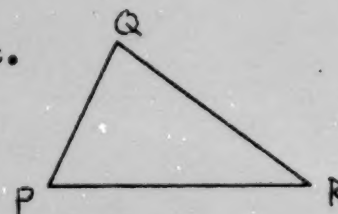
F

25. Figure PQR is a _____.
Get a metric ruler and measure the
3 sides of the triangle to the right.

26. PQ = _____ cm.

27. QR = _____ cm.

28. PR = _____ cm.



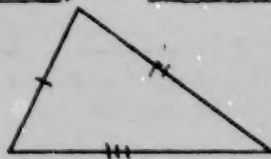
29. Are any of the sides the same length? _____

This is another special kind of triangle and has the name Scalene.

30. Any triangle which has no 2 sides of the same length is called a _____.

Identify each of the following triangles. (Write Equilateral, Isosceles, or Scalene in the space provided.)

31.



32.



33.



34.



LEVEL Q CHECKPOINT 13-14

Informal Geometry

Name _____

Period _____

Date _____

Name the right angle and the hypotenuse in the triangle below.



(Q-13)

1) right $\angle$ _____

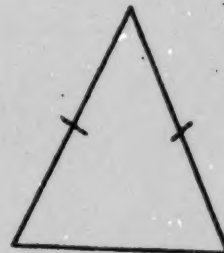
2) Hypotenuse _____

Identify each of the following triangles. (Write Equilateral, Isosceles, or scalene in the space provided.)

3) _____

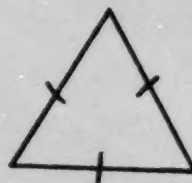


4) _____



5) _____

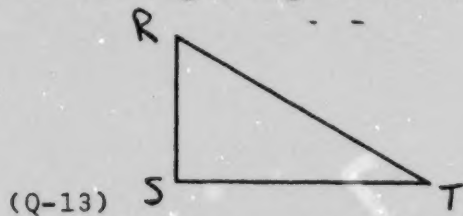
(Q-14)



LEVEL Q A-CHECKPOINT 13-14
Informal Geometry

Name _____
Period _____
Date _____

Name the right angle and the hypotenuse in the triangle below

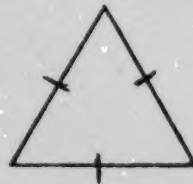


1) right angle _____

2) hypotenuse _____

Identify each of the following triangles. (write Equilateral, Isosceles, or scalene in the space provided.)

3) _____

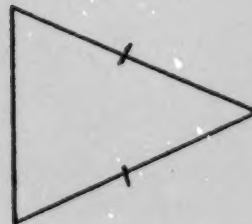


4) _____



5) _____

(Q-14)



LEVEL Q POSTTEST
Informal Geometry

Name _____
Period _____
Date _____

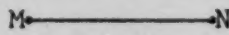
1) Between any two points on a line there must be at least _____ other _____.

2) A dot on a paper is used to represent a _____.

(Q-1)

3) Write the symbol for line segment AB _____

4) Give two different names for this diagram.

 a) _____ b) _____

5) A line segment is named by its _____.

(Q-2)

6) Write the symbol for a line through points A and B _____

7) Name this line in six ways 1) _____ 2) _____ 3) _____

 4) _____ 5) _____ 6) _____

(Q-3)

8) Two lines with a common _____ are intersecting lines.

9) Parallel lines never _____.

(Q-4)

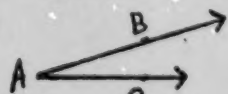
10) The intersection of a plane and a line is a _____.

11) A plane divides space into _____ parts.

(Q-5)

12) Draw $\overrightarrow{AB}$ to the right 

13) Given the two points A and B, write the symbol for the ray beginning at B and going through A. _____

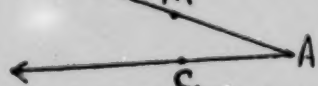
14)  Name the two rays in this diagram _____, _____

(Q-6)

15)  Name the vertex of this angle _____

16) Name the sides of the angle in problem 11. _____, _____

(Q-7)

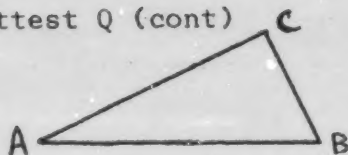
17)  Name this angle in two different ways _____, _____

18) Draw $\angle ZAP$

(Q-8)

Posttest Q (cont)

19)



Name this triangle in two different ways.

- 20) Draw and label $\triangle$ MAN to the right

(Q-9)

21)



One angle of this triangle is $\angle$ MNO

Name the other two angles

_____, _____

- 22) In the triangle above, which side is opposite $\angle$ MNO ? _____

(Q-10)

- 23) An angle that looks like a square corner is called a _____ angle.

- 24) Perpendicular lines form _____ angles.

(Q-11)

- 25) An angle measuring more than 90° but less than 180° is called an _____ angle.

- 26) An angle that measures 180° is called a _____ angle.

- 27) An angle measuring more than 0° but less than 90° is called an _____ angle.

(Q-12)

- 28) The hypotenuse of a right triangle is always opposite the _____ angle.

- 29) The sides making up the right angle of a right triangle are called the _____.

(Q-13)

- 30) A triangle with at least two sides equal is called an _____ triangle.

- 31) If a triangle has all three sides equal it is called an _____ triangle.

- 32) A scalene triangle has _____ sides equal.

(Q-14)

WORD LIST to help with your spelling:

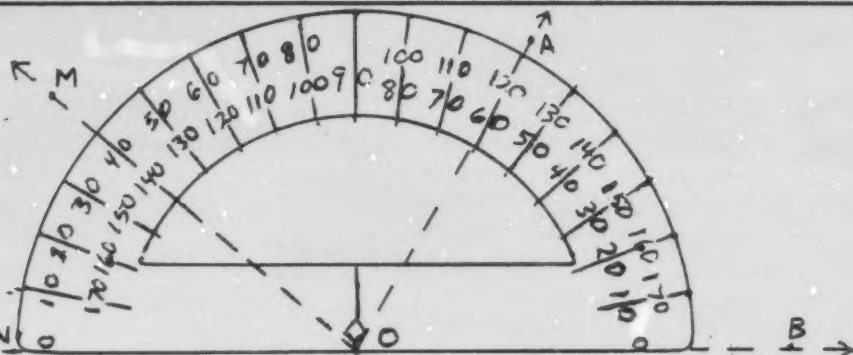
Acute, endpoints, equilateral, hypotenuse, intersect (ing),

Isosceles, line, legs, obtuse, parallel, perpendicular,

point, ray, right, scalene, segment, straight, vertex.

Name _____ Period _____ Date _____

Objective: You will be able to read a protractor and place it over an angle and measure the size of the angle.



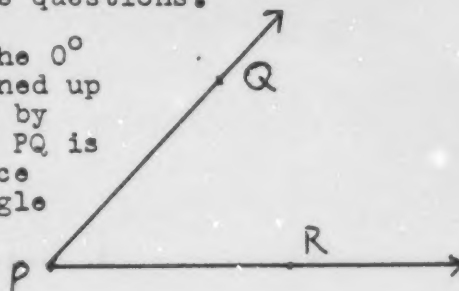
Things to notice:

1. Two number scales that can be read from either side. Always read from one ray up to the other ray. $\angle AOB$ measures 60° not 120° .
2. The bottom of the protractor is laid on top of the ray. The 0° mark and the diamond in the middle are laid on the ray. The bottom tip of the diamond is laid on the vertex of the angle.
3. $\angle MON$ measures 40° not 140° . You may use either side of the protractor.

1. Use your protractor to answer these questions.

Place the center mark on point P. The 0° mark on the right side should be lined up with PR. Find the number of degrees by reading the lower scale of numbers. PQ is between 45° and 50° . Each little space represents 1° , so the measure of angle

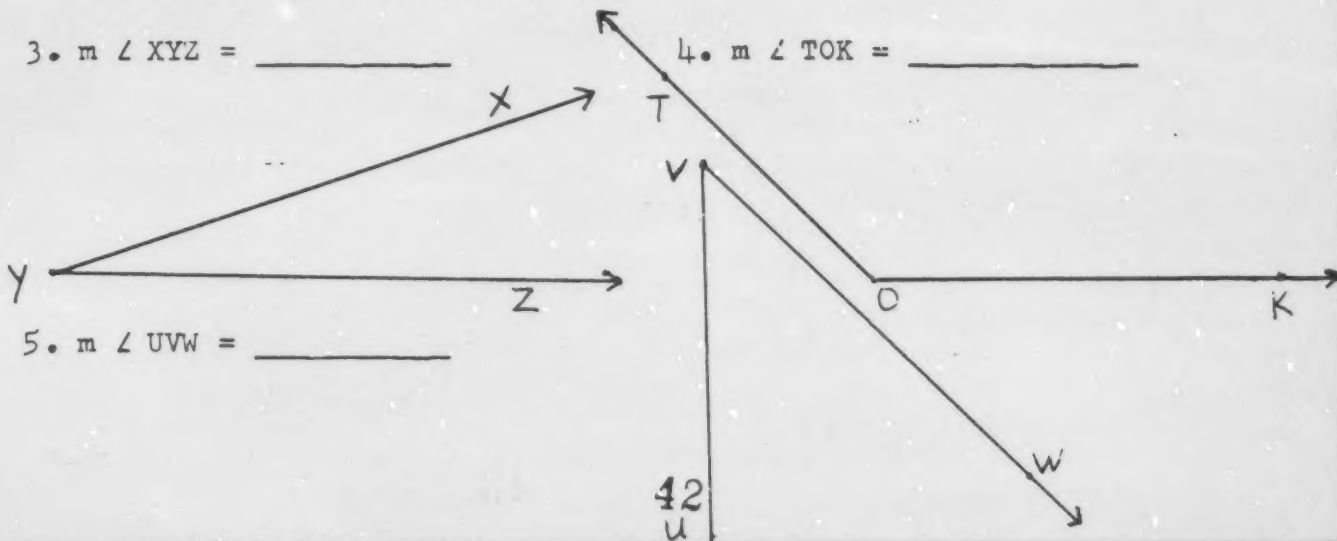
QPR is _____ $^\circ$.



2. The measure of angle ABC is _____ $^\circ$.
The measure of angle ABC can be written using the symbols that follow. $m\angle ABC$

3. $m\angle XYZ =$ _____

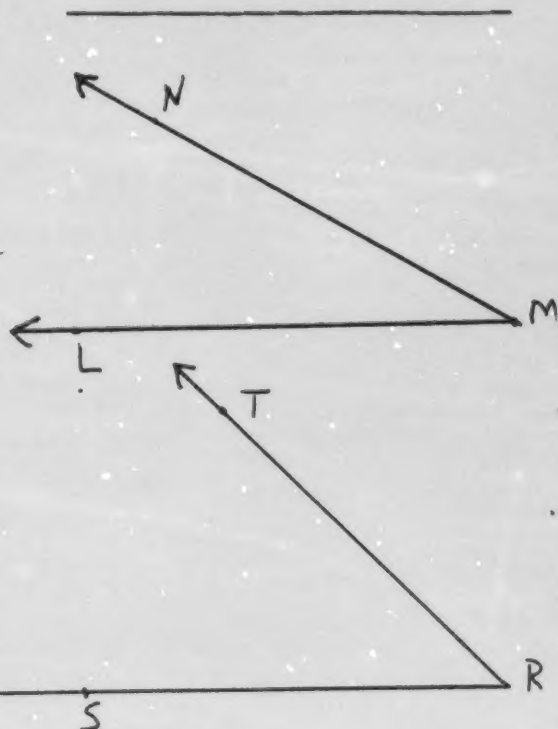
4. $m\angle TOK =$ _____



5. $m\angle UVW =$ _____

6. $m \angle LMN =$ _____

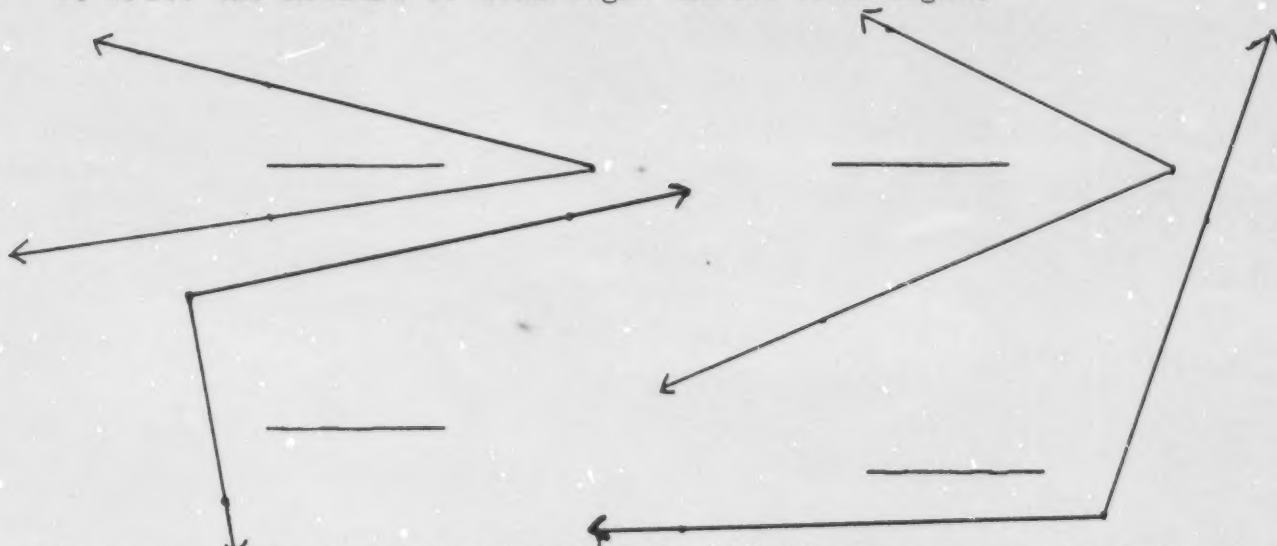
Sometimes we use the upper scales of numbers. In the angle to the right, $\angle LMN$, place the center mark of the protractor on point M and line up ML with the 0 mark at the left side of your protractor. Now count along the upper scale. MN indicates a point between 30 and 40.



7. $m \angle TRS =$ _____

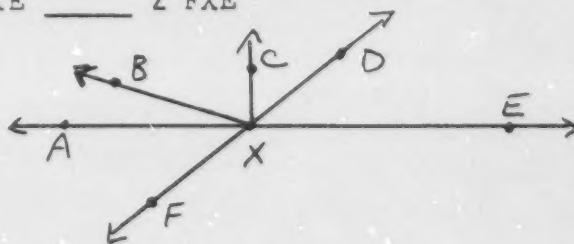


8. Write the measure of each angle inside each angle.



9. Compare the size of the angles in the diagram on the right. Indicate if the first angle is $<$ less than, $>$ greater than, or $=$ equal to the second angle.

- a. $\angle AXC$ _____ $\angle AXB$ b. $\angle CXD$ _____ $\angle EXF$
 c. $\angle FXD$ _____ $\angle AXE$ d. $\angle DXE$ _____ $\angle FXE$
 e. $\angle AXC$ _____ $\angle CXE$
 f. $\angle BXD$ _____ $\angle DXB$



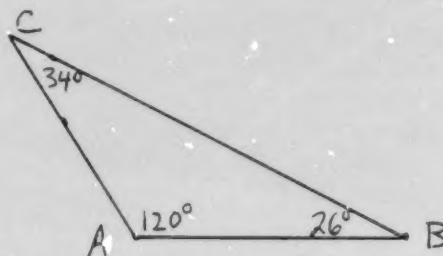
MEASURING ANGLES OF A TRIANGLE - SUMMATION QA-2

Name _____ Period _____ Date _____

Objectives: You will be able to (1) Measure and write the number of degrees in each of the angles of a $\triangle$, (2) Find and write the sum of the measures of the angles of a $\triangle$, (3) Write the source of the measures of the angles of any triangle without measuring.

Finding the sum of the measures of the angles of a triangle.

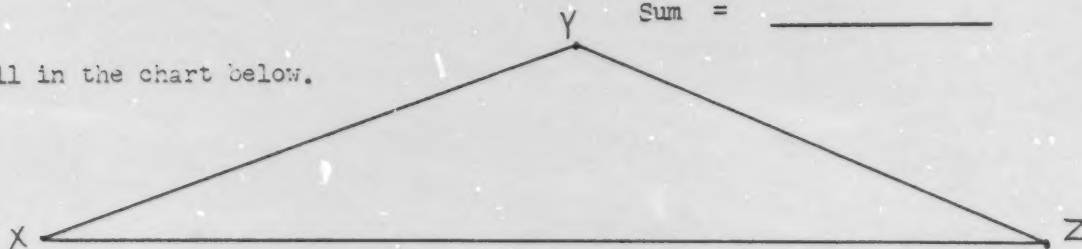
(1) Fill in the chart below.



Angle	Name	Measure
$\angle CAB$	obtuse	_____
$\angle ACB$	acute	_____
$\angle ABC$	_____	26°

Sum = _____

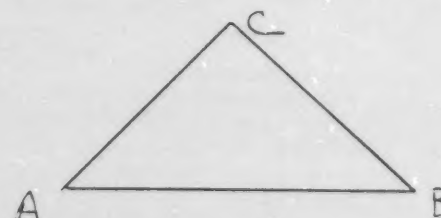
(2) Fill in the chart below.



Angle	Name	Measure
$\angle ZXY$	acute	_____
$\angle XYZ$	_____	137°
$\angle$ _____	acute	_____

Sum = _____

Notice that if the point is the vertex of only angle, the letter at that point can name the angle.



Name _____

(3)

AngleNameMeasure $\angle P$

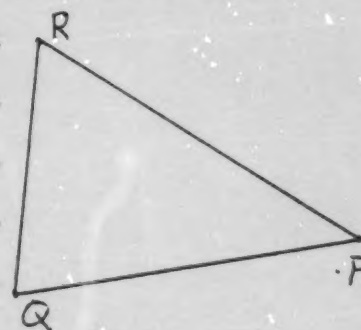
acute

 $\angle Q$

77

 $\angle R$

Sum =



(4)

AngleNameMeasure

Sum =

(5) The sum of the measures of the angles of a triangle equals _____.

(6)

AngleNameMeasure

Sum =

(7)

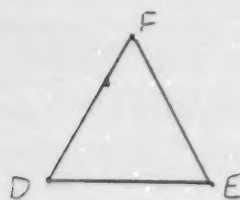
AngleNameMeasure

Sum =

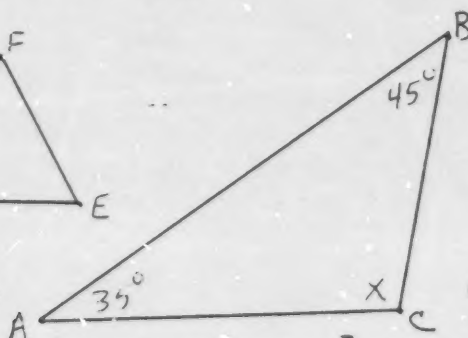
(8)

AngleNameMeasure

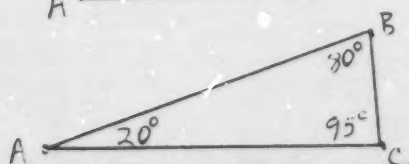
Sum =



(9)

Compute (don't measure) the measure of $\angle C$. _____.

(10)



What's wrong with this picture? _____

PROTRACTORS AND DRAWING ANGLES QA-3

Name _____ Period _____ Date _____

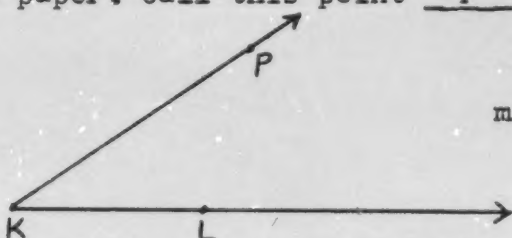
Objective: You will be able to use a protractor to draw an angle of any given size.

1. If we want to draw an angle of a certain measure, we use a protractor. To draw an angle of 35° , for example, we first draw a ray like KL below.



2. Next we place the center point of the protractor (diamond) on the _____ of the ray, point K, and place the 0° line along $\overrightarrow{KL}$. Read along the row of numbers to 35° , and mark a dot on the paper. Call this point P.

3. Draw $\overrightarrow{KP}$



$m \angle \text{ } = 35^\circ$ acute

Draw angles of the given measures, and label each as right, straight, acute, or obtuse. The ray is given in number 4.

4. 48°

5. 18°



6. 83°

7. 115°

8. 160°

9. 90°

Follow the directions from the front page.

10. 89°

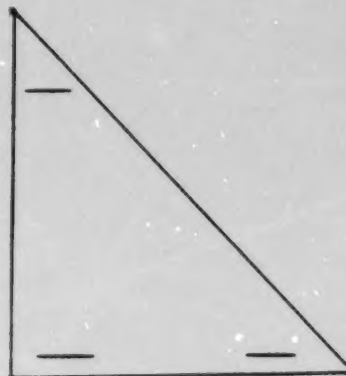
11. 180°

Measure each angle in these triangles and write the measure inside the angle

12.



13.



14. Draw a triangle whose angles measure 30° , 60° , 90° .

Review: Fill in the blanks

15. A _____ angle has a measure of 90° .

16. An _____ angle has a measure between 0 and 90° .

17. An _____ angle has a measure between 90 and 180° .

18. A _____ angle has a measure of 180° .

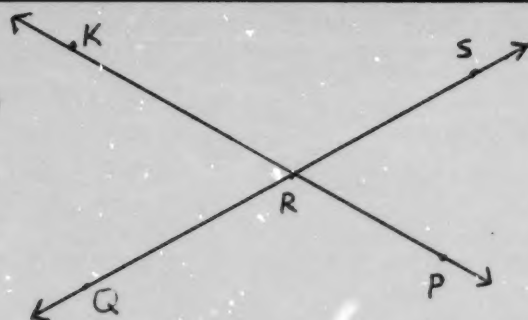
Unscramble these words on angles.

a. griht = _____ b. tesubo = _____

c. texrev = _____ d. tauce = _____

e. tarrotcrop = _____

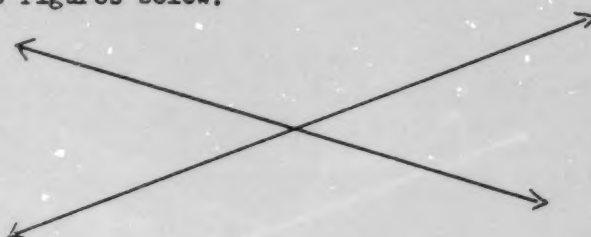
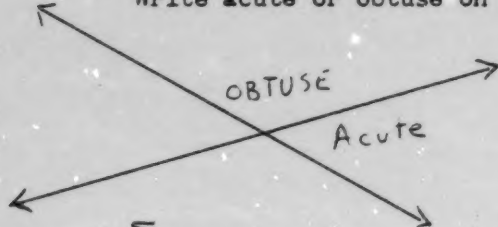
(7)



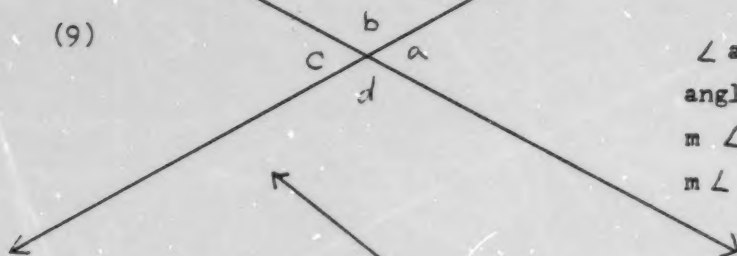
$\overleftrightarrow{KP}$ and $\overleftrightarrow{QS}$ intersect at point R .
 One pair of vertical angles is made up of 2 acute angles, $\angle$ and $\angle$.
 The other pair of vertical angles is obtuse.
 Name this pair. and .

(8)

Write acute or obtuse on each angle in the figures below.

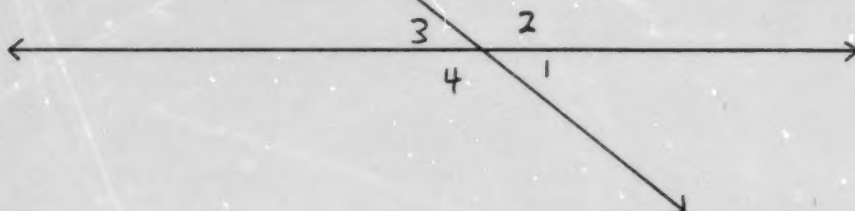


(9)



$\angle a$ and $\angle c$ are a pair of angles. Measure them with your protractor.
 $m \angle a =$ and $m \angle c =$.
 $m \angle b =$ and $m \angle d =$.

(10)



$m \angle 1 =$
 $m \angle 3 =$
 $m \angle 2 =$
 $m \angle 4 =$

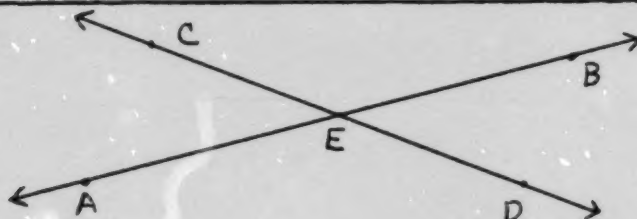
(11) In #9, did you get the same measure for $\angle a$ and $\angle c$?
 You should have. How does $m \angle b$ compare with $m \angle d$?
 They should be the same.

(12) In #10, does $m \angle 1 = m \angle 3$? Is $m \angle 2 = m \angle 4$?

(13) Complete this sentence: In a pair of vertical angles, the measures of the two angles .

Name _____ Period _____ Date _____

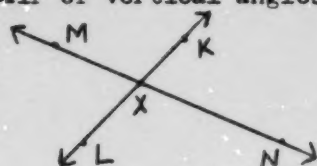
Objective: You will be able to: Identify and name vertical angles



- (1) These two lines, AB and CD, cross or intersect at point _____.
Are there any acute angles in the figure? _____. If so, name them.

- (2) There are 2 obtuse angles in the above figure. Name them. _____
(3) $\angle AEC$ and $\angle BED$ are opposite each other. They are called vertical angles.
Another pair of vertical angles in the above figure is _____ and _____.

(4)



$\overleftrightarrow{MK}$ and _____ intersect at point _____. $\angle LXN$ and _____ are vertical angles. Another pair of vertical angles are _____ and _____.

(5)



Label these lines as $\overleftrightarrow{RS}$ and $\overleftrightarrow{GH}$. The point of intersection should be point P.
List the 2 pairs of vertical angles.

a) _____ b) _____ c) _____ d) _____

- (6) Draw 2 intersecting lines and name them so that one pair of vertical angles will be $\angle AYC$ and $\angle BYD$.

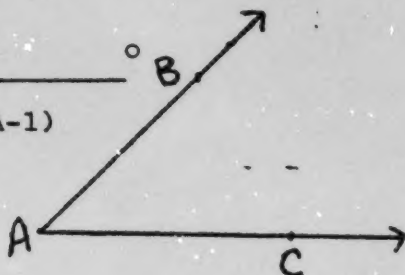
The other pair of vertical angles are $\angle$ _____ and $\angle$ _____.

LEVLE QA CHECKPOINT 1-4
Informal Geometry II

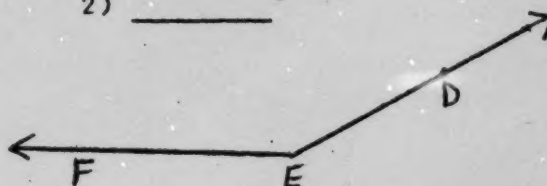
Name _____
Period _____
Date _____

Measure the following angles using a protractor

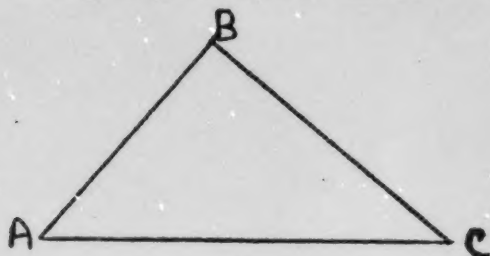
1) _____
(QA-1)



2) _____



using a protractor measure each angle in the triangle below



(QA-2)

3) A = _____°

4) B = _____°

5) C = _____°

Using a protractor draw angles having measures given below

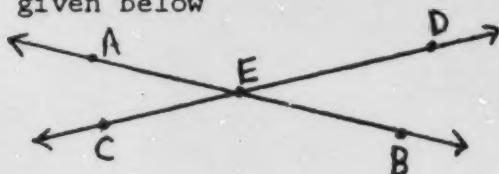
6) 50°

7) 120°

8) 100°

(QA-3)

Name 2 pairs of vertical angles formed by the intersecting lines given below



(QA-4)

9) $\angle$ _____ and $\angle$ _____

10) $\angle$ _____ and $\angle$ _____

LEVEL QA A-CHECKPOINT 1-4

Name _____

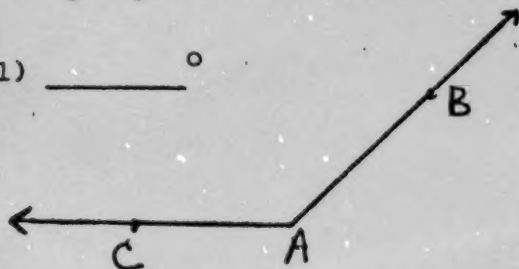
Informal Geometry II

Period _____

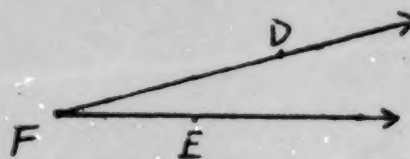
Date _____

Using a protractor measure the angles below

1) _____°



2) _____°



(QA-1)

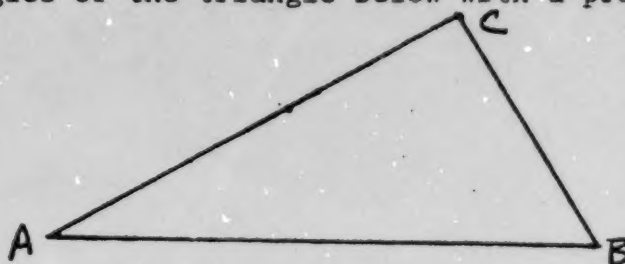
Measure each of the angles of the triangle below with a protractor

3) $\angle A =$ _____

4) $\angle B =$ _____

5) $\angle C =$ _____

(QA-2)



Draw angles having the same measure as those below

6) 45°

7) 110°

8) 75°

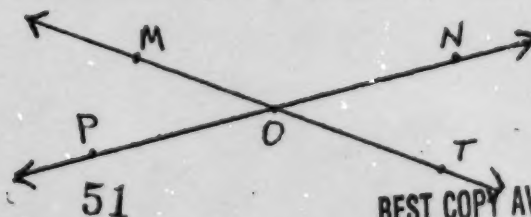
(QA-3)

Give the names of two pairs of vertical angles formed by the two intersecting lines below

9) $\angle$ _____ and $\angle$ _____

10) $\angle$ _____ and $\angle$ _____

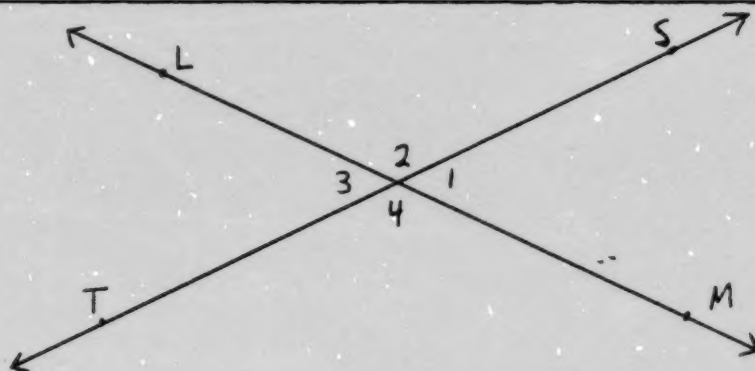
(QA-4)



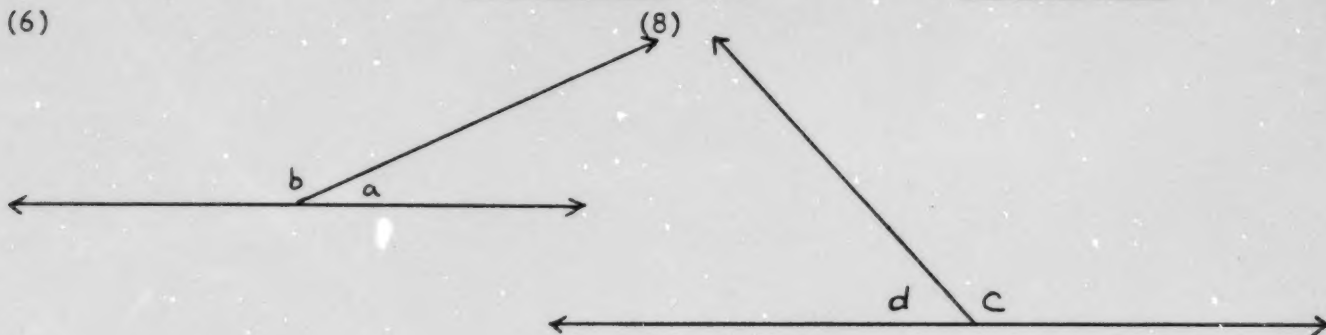
BEST COPY AVAILABLE

Name _____ Date _____ Period _____

Objective: You will be able to identify and name complementary and supplementary angles.



- (1) In previous levels you named pairs of angles that are vertical angles.
In the above drawing $\overleftrightarrow{LM}$ and $\overleftrightarrow{ST}$ intersect, forming $\angle 1$, $\angle 2$, $\angle 3$, and $\angle 4$.
One pair of vertical angles is $\angle$ _____ and $\angle$ _____. The other pair is $\angle$ _____ and $\angle$ _____.
- (2) With your protractor measure each angle. $m\angle 1 =$ _____ $m\angle 2 =$ _____
 $m\angle 3 =$ _____ $m\angle 4 =$ _____
- (3) How does $m\angle 1$ compare with $m\angle 3$? _____
Compare $m\angle 2$ with $m\angle 4$. _____
- (4) $m\angle 1 = m\angle 3$ and $m\angle 2 = m\angle 4$, since _____ angles have the same measure.
- (5) What is $m\angle 1 + m\angle 2$? _____ $m\angle 3 + m\angle 4 =$ _____
- (6) _____

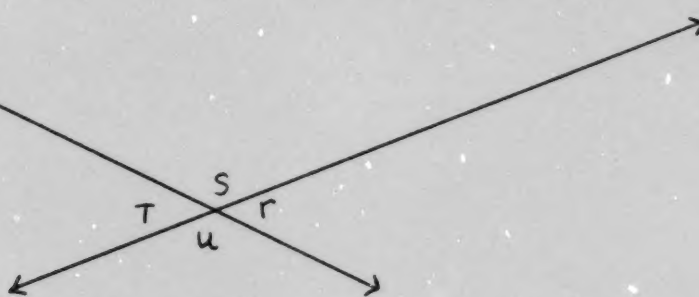


With your protractor measure the angles above in drawing (6) $m\angle a =$ _____ Measure angles c and d above. (8)
 $m\angle c =$ _____ $m\angle d =$ _____
 $m\angle b =$ _____ (9) $m\angle c + m\angle d =$ _____

- (7) $m\angle a + m\angle b =$ _____
- (10) Were your answers for #5, #7, and #9 equal to 180° ? _____
They should have been, since the two angles together make a straight line. The measure of a straight angle is _____.

(11) Any two angles are called supplementary if the sum of their measures is 180° .

A pair of supplementary angles in the figure below is _____ and _____



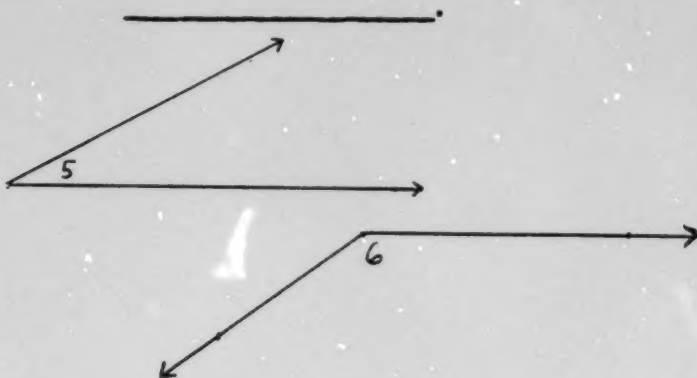
(12) Could a pair of angles be supplementary if they were arranged like these

Yes, if the sum of their measures equals 180°

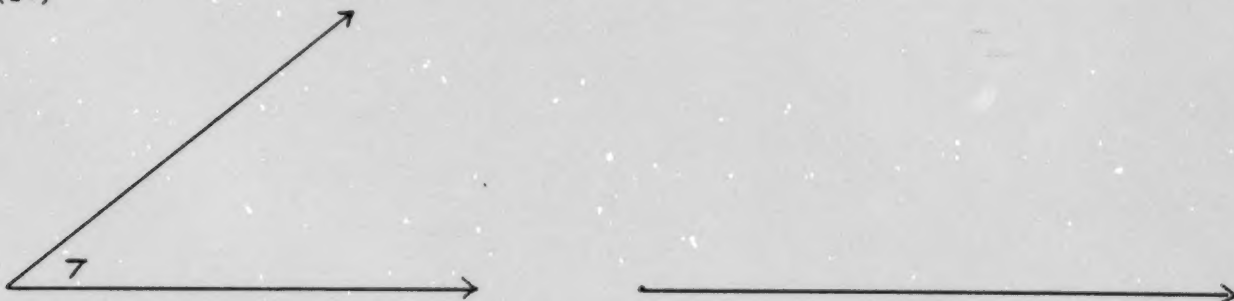
$m\angle 5 =$ _____ $m\angle 6 =$ _____

$m\angle 5 + m\angle 6 =$ _____

(13) Any two angles are _____ if the sum of their measures equals 180° . Each angle is called supplement of the other angle.

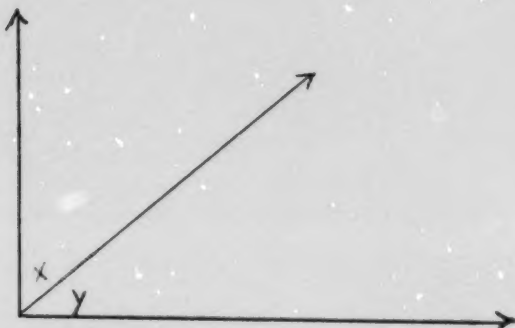


(14)



Measure $\angle 7$. On the ray at the right, using your protractor, draw the supplement of $\angle 7$. (15)

In the figure to the left, $\angle x$ and $\angle y$ together make a right angle. How many degrees in a right angle? _____



(16) Measure the two angles in #15.

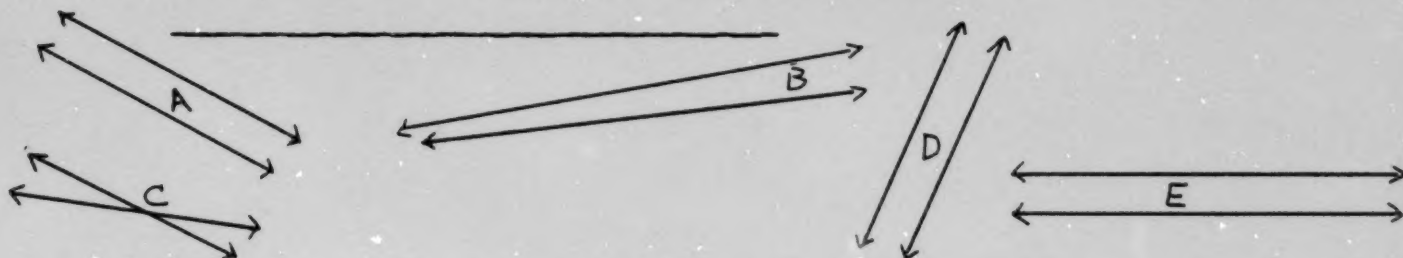
$m\angle x =$ _____ $m\angle y =$ _____

(17) Any two angles are called complementary if the sum of their measures equals 90° . $\angle x$ and $\angle y$ (in #15) are _____ angles. Each angle is the complement of the other angle.

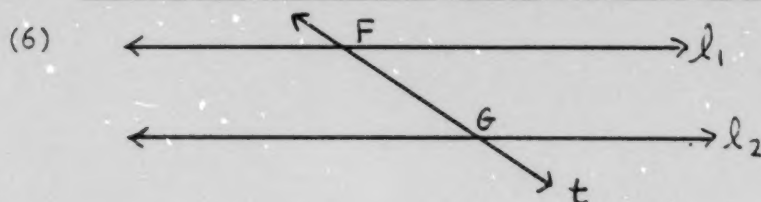
Name _____ Period _____ Date _____

Objective: You will be able to recognize pairs of parallel lines and transversals by listing them.

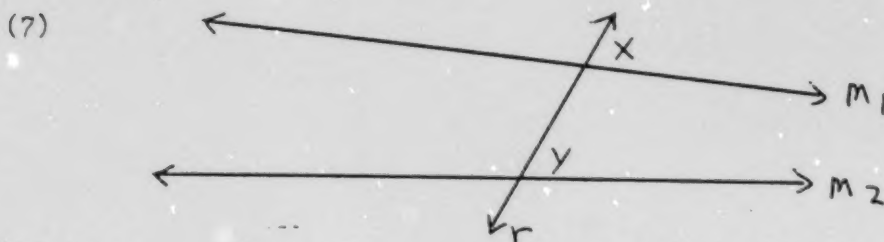
- (1) Do you remember what parallel lines are? _____
- (2) Parallel lines are lines which are in the same plane but which never _____.
- (3) Consider the plane of this paper. Which pairs of lines below seem to be parallel?



- (4) In #3, you should have answered a, d, and e. Were you right? _____
- (5) Look at #3 (B). Why are the lines not parallel? _____

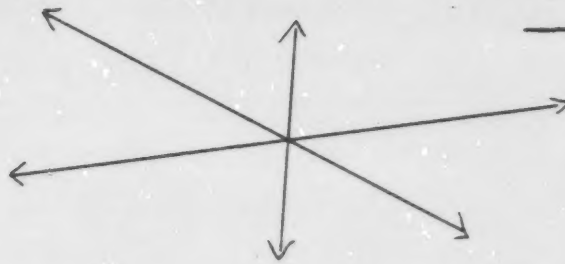


In this figure, lines l_1 and l_2 are parallel. We can write this as $l_1 \parallel l_2$
 (read " l_1 is parallel to l_2 "). A third line, t , intersects both l_1 and l_2 .
 It is called a transversal. Transversal t intersects line l_1 at a point _____
 and l_2 at point _____.

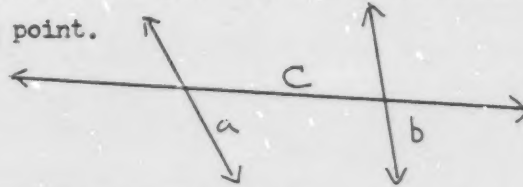


Complete: _____ r intersects line _____ at point _____
 at point X and _____ at point _____.

- (8) In #7, lines m_1 and m_2 are not parallel, but r is a transversal since it intersects each line in a different point.

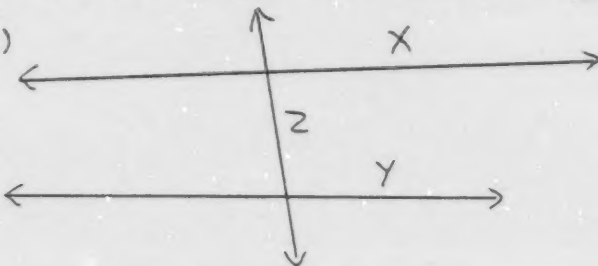


In the above drawing there are 3 lines, but there is no transversal, since the lines all intersect in one point.



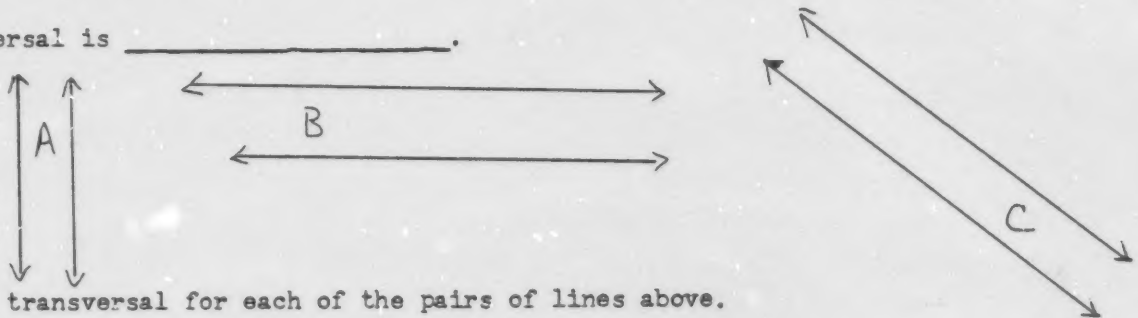
In the above drawing, the transversal is _____.

(9)



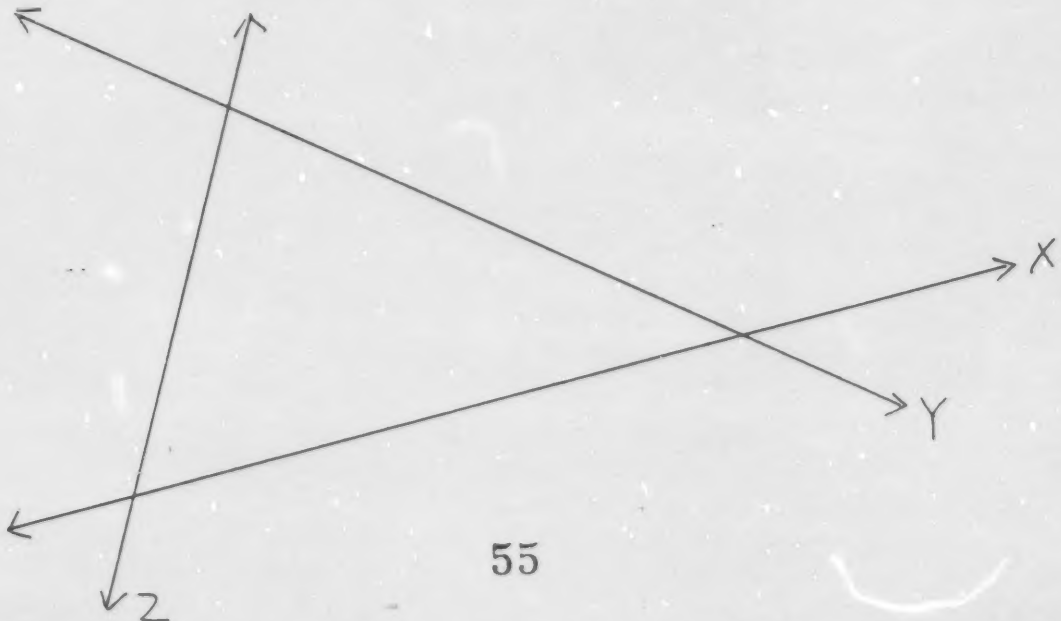
The transversal is _____.

(10)



Draw a transversal for each of the pairs of lines above.

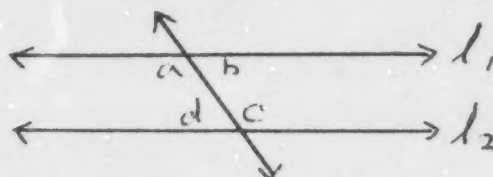
(11) Is there a transversal in the picture below? _____



PAIRS OF ANGLES (INTERIOR AND EXTERIOR) QA-7

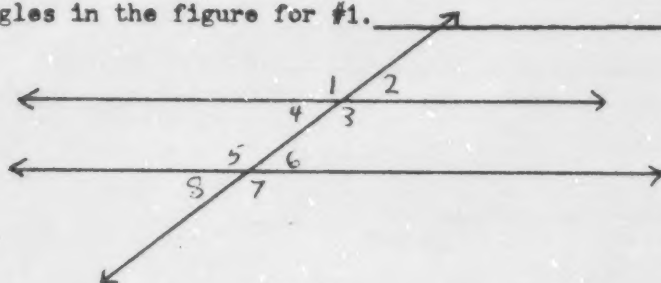
Name _____ Period _____ Date _____

Objective: You will be able to list alternate interior and exterior angles when given a picture containing same.



- (1) Lines l_1 and l_2 are cut by _____ t, forming some angles. Angles a, b, c, and d are between the two lines l_1 and l_2 , so we call them interior angles.
- (2) $\angle a$ and $\angle b$ are called adjacent angles because they are next to each other. Name two other adjacent angles. _____
- (3) In the figure above, $\angle a$ and $\angle c$ are non-adjacent and are on opposite or alternate sides of the transversal. $\angle a$ is to the left of the transversal and $\angle c$ is to the _____ of the _____. So angles a and c are called alternate angles. (Notice they are non-adjacent.)
- (4) Since angles a and c are interior angles and they are also alternate angles, we call them alternate interior angles. Name another pair of alternate interior angles in the figure for #1. _____

(5)

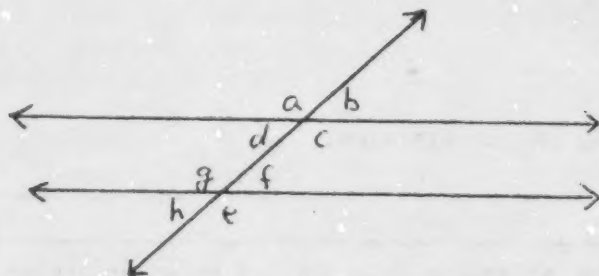


Name two pairs of alternate interior angles in the above drawing.

a) $\angle$ _____ and $\angle$ _____ b) $\angle$ _____ and $\angle$ _____

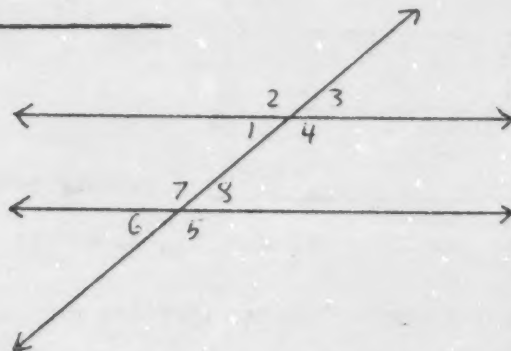
- (6) In the above drawing, $\angle 1$, $\angle 2$, $\angle 7$, and $\angle 8$ are outside the two lines, instead of between them. Since $\angle 2$ and $\angle 8$ are non-adjacent, they could be a pair of _____ angles. Another pair of alternate exterior angles is _____.

(7)



In the figure above name the two pairs of alternate interior angles _____
 _____ and the two pairs of alternate exterior angles. _____

(8)

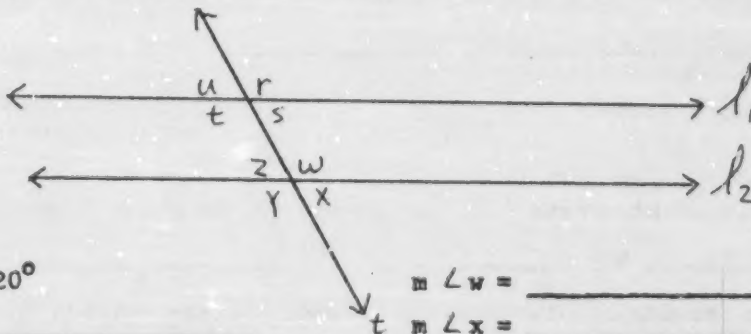


The lines are parallel. $\angle 1$ and $\angle 8$ are alternate _____ angles.
 Measure them. How do their measures compare? _____

- (9) In the figure for #8, $\angle 2$ and $\angle 5$ are alternate _____ angles.
 How do their measures compare? _____
 Measure the other pair of alternate exterior angles. $m\angle 6 =$ _____ and
 $m\angle$ _____ = _____

Complete: If lines are parallel, _____ exterior angles have
 _____.

In the following problems, do not measure. Just work out the answers. Lines l_1 and l_2 are parallel.



- (10) $m\angle r = 120^\circ$

$m\angle s =$ _____
 $m\angle t =$ _____
 $m\angle u =$ _____

$m\angle w =$ _____
 $m\angle x =$ _____
 $m\angle y =$ _____
 $m\angle z =$ _____

- (11) $m\angle r =$ _____

$m\angle s =$ _____
 $m\angle t =$ _____
 $m\angle u =$ _____

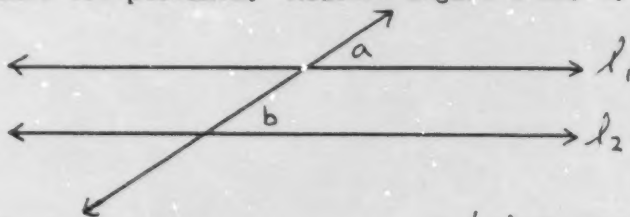
$m\angle w =$ _____
 $m\angle x =$ _____
 $m\angle y =$ _____
 $m\angle z =$ _____

PAIRS OF ANGLES (CORRESPONDING) QA-8

Name _____ Period _____ Date _____

Objective: You will be able to identify corresponding angles by listing them.

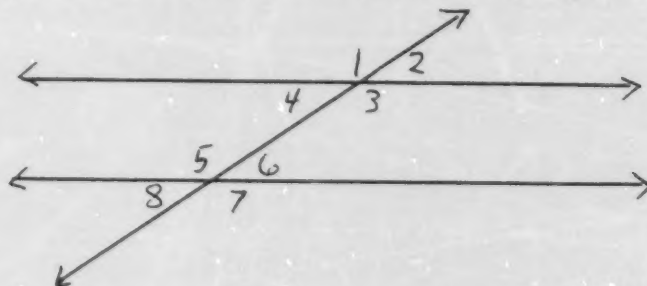
- (1) These lines are parallel. Measure angles a and b.



$m \angle a =$ _____ $m \angle b =$ _____

- (2) Did you find that $m \angle a = m \angle b$? _____ You should **have**. Notice that angles a and b lie on the same side of the transversal. Also notice that $\angle a$ lies above line l_1 and $\angle b$ lies above line l_2 . They are in positions which correspond, so we call them corresponding angles.

(3)



$\angle 4$ and $\angle 8$ are corresponding angles because they lie on the _____ side of the transversal and each angle lies below the line.

$\angle 3$ and $\angle$ _____ are corresponding angles because they lie on the same side of the _____ and each angle lies _____ the line.

$\angle 2$ and $\angle$ _____ are corresponding angles.

$\angle$ _____ and $\angle 5$ are corresponding angles.

When two lines are cut by a transversal, _____ pairs of corresponding angles are formed.

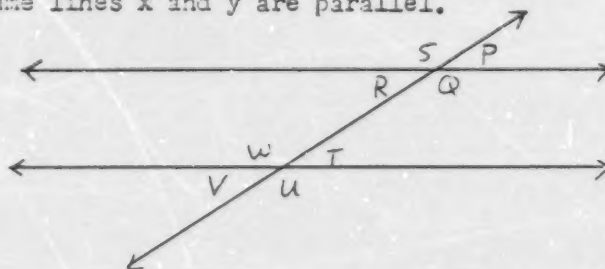
your protractor to find these:

$m \angle a =$ _____ $m \angle f =$ _____

$$m \angle a = \underline{\hspace{2cm}}$$
$$m \angle f = \underline{\hspace{2cm}}$$
$$m / g = \underline{\hspace{2cm}}$$
$$m \angle h = \underline{\hspace{2cm}}$$
$$m \angle e = \underline{\hspace{2cm}}$$
$$m \angle b = \underline{\hspace{2cm}}$$
$$m \angle C = \underline{\hspace{2cm}}$$
$$m \angle d = \underline{\hspace{2cm}}$$

The above are grouped in pairs of corresponding angles. What did you find out about the measures of corresponding angles?

Since corresponding angles have equal measure, find the following without measuring. Assume lines x and y are parallel.



(5) $\angle p = 35^\circ$

$$m \angle t = \underline{\hspace{2cm}}$$
$$m L q = \underline{\hspace{2cm}}$$
$$m / u = \underline{\hspace{2cm}}$$
$$Lr = \underline{\hspace{2cm}}$$
$$m \angle v = \underline{\hspace{2cm}}$$
$$L_S = \underline{\hspace{2cm}}$$
$$m \angle W = \underline{\hspace{2cm}}$$

(6) $\ln L_p =$ _____

22 $L^t =$ _____

$$m L q = \underline{\hspace{2cm}}$$
$$\alpha / u = 140^\circ$$
$$Lr = \underline{\hspace{2cm}}$$
$$\eta / v =$$
$$A / S = \underline{\hspace{2cm}}$$
$$\ln L =$$

LEVEL QA CHECKPOINT 5-8

Informal Geometry II

Name _____

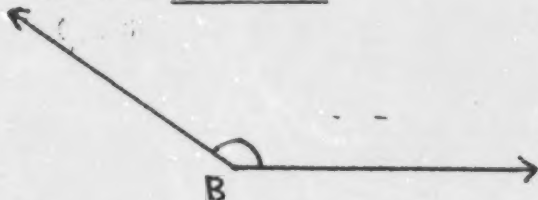
Period _____

Date _____

Using a protractor measure the angle below and draw its supplement

1) $m\angle B$ _____^o

2) Supplement of $\angle B$ = _____^o

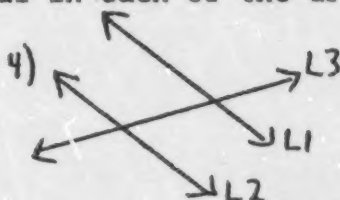


3) Two adjacent angles whose sum is 90° , are called _____ angles.

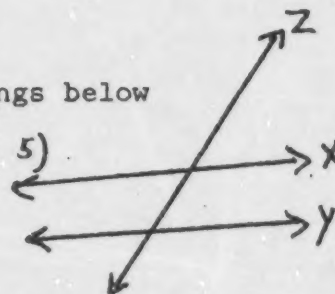
(QA-5)

Name the transversal in each of the drawings below

4) _____



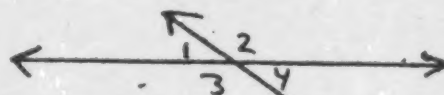
5) _____



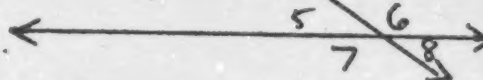
(QA-6)

Name two pairs of alternate exterior angles in the drawing below

6) $\angle$ _____ and $\angle$ _____



7) $\angle$ _____ and $\angle$ _____



Name one pair of alternate interior angles from the drawing above

8) $\angle$ _____ and $\angle$ _____

(QA-7)

Name two pairs of corresponding angles from the drawing above

9) $\angle$ _____ and $\angle$ _____

10) $\angle$ _____ and $\angle$ _____

(QA-8)

LEVEL QA A-CHECKPOINT 5-8

Informal Geometry

Name _____

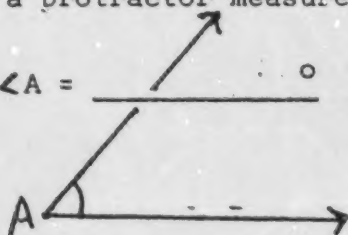
Period _____

Date _____

Using a protractor measure the angle below and draw its compliment

1) $m\angle A =$ _____^o

2) Compliment of $\angle A =$ _____^o



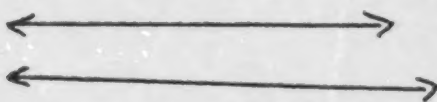
3) Two adjacent angles whose sum is 180° , are called

_____ angles

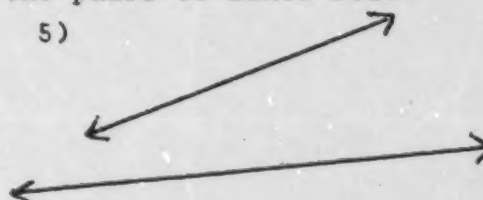
(QA-5)

Draw a transversal for each of the pairs of lines below

4)



5)

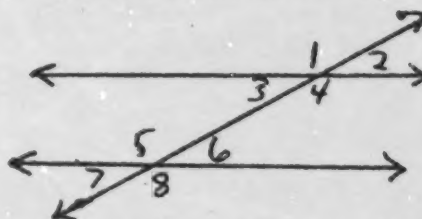


(QA-6)

Name two pairs of alternate interior angles from the drawing below

6) $\angle$ _____ and $\angle$ _____

7) $\angle$ _____ and $\angle$ _____



Name one pair of alternate exterior angles from the drawing above

8) $\angle$ _____ and $\angle$ _____

(QA-7)

Name two pairs of corresponding angles from the drawing above

9) $\angle$ _____ and $\angle$ _____

10) $\angle$ _____ and $\angle$ _____

(QA-8)

QUADRILATERALS (PART 1) QA-9

Name _____ Period _____ Date _____

Objectives: You will be able to select a quadrilateral from a group of polygons and select a trapezoid from a group of quadrilaterals.

(1) Draw 4 points. No 3 may be on the same line.

(2) Name the points A, B, C, D.

(3) Draw $\overline{AB}$, $\overline{BC}$, $\overline{CD}$, $\overline{AD}$.

You have just drawn a quadrilateral. A quadrilateral is a closed 4-sided figure.

(4) Any 4-sided figure is called a _____.

Which of the following figures are quadrilaterals?
(answer: "quadrilateral" or "not quadrilateral".

Example:

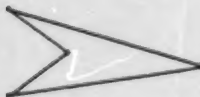


quadrilateral

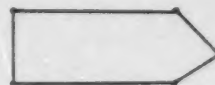
(5)



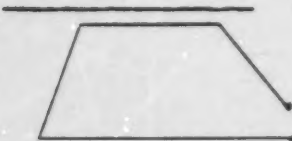
(6)



(7)



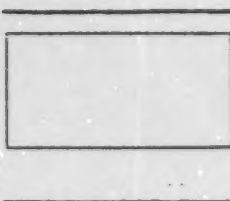
(8)



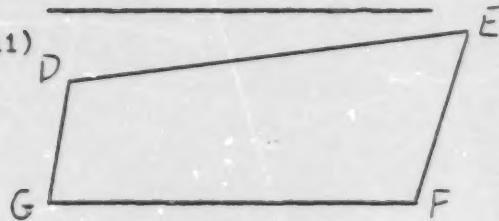
(9)



(10)



(11)



In problem 11, D, E, F, and G are vertices of the quadrilateral. We give a name to a quadrilateral by listing the names of the vertices in order. The quadrilateral above could be called DEFG, DGEF, EFGD, or EDGF.

Give 4 more names we might use. _____

Give the names of the sides, the names of the angles, and 2 names for each quadrilateral.

Example:



Sides: $\overline{PQ}$, $\overline{QR}$, $\overline{SR}$, $\overline{PS}$.

Angles: $\angle SPQ$, $\angle PQR$, $\angle QRS$, $\angle PSR$ or
 $\angle P$, $\angle Q$, $\angle R$, $\angle S$

Names: PQRS, PSRQ

(12)



Sides: _____

Angles: _____

Names: _____

(13)



Sides: _____

Angles: _____

Names: _____

(14)

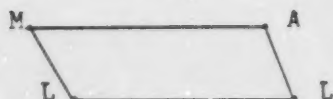


Sides: _____

Angles: _____

Names: _____

(15)



Sides: _____

Angles: _____

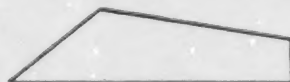
Names: _____

(16) Now draw a quadrilateral which has only two sides parallel. (like problem 12)

(17) Name the 2 parallel sides $\overline{AB}$ and $\overline{DC}$. This is a special kind of quadrilateral and is called a trapezoid.

Which of the following are trapezoids? (answer: "trapezoid" or "not trapezoid".)

Example:

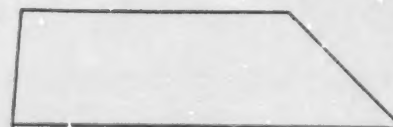


not a trapezoid

(18)



(19)



QUADRILATERALS (PART II) QA-10

NAME _____ PERIOD _____ DATE _____

Objective: You will be able to select and write the name of each of the following:
a) trapezoid; b) parallelogram; c) rectangle; d) square

(1) A _____ is any closed 4-sided figure which has one pair of parallel sides.

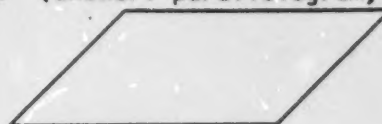
(2) Now draw a quadrilateral which has 2 pairs of parallel sides.

(3) Label the vertices P, Q, R, & S so that $\overline{PQ}$ is parallel to $\overline{RS}$, and $\overline{PS}$ is parallel to $\overline{QR}$.
This is another special kind of quadrilateral and has the name parallelogram.
Which of the following are parallelograms? (answer: parallelogram, or not a parallelogram.)

Example:

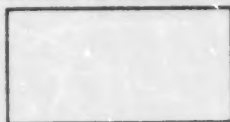


(4)



not a parallelogram

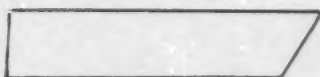
(5)



(6)



(7)



(8)



(9)



(10) A _____ is a quadrilateral with 2 pairs of parallel sides.

(11) A _____ is a quadrilateral with 1 pair of parallel sides.

(12) A closed 4-sided figure is called a _____.

A.

.B

(13) Draw $\overline{AB}$, $\overline{BC}$, $\overline{CD}$, $\overline{DA}$.

°C

- (14) $\overline{AD}$ is perpendicular to _____ and _____.
- (15) All of the angles are _____ angles.
- (16) ABCD is a quadrilateral.
ABCD is also a _____.
This is another special kind of quadrilateral and has the name rectangle.

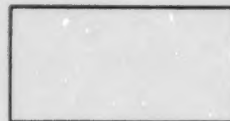
- (17) A _____ is a parallelogram with square corners.
Which of the following are rectangles? (answer: "rectangle", or "not a rectangle".)

Example:

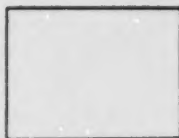


not a rectangle

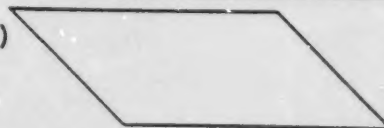
(18)



(19)



(20)



(21)



Problem 21 shows a special kind of rectangle.

- (22) All the sides have the same _____.
This kind of rectangle is called a square.

- (23) A _____ is a rectangle whose sides have the same length.

Give the most specific name for each of the figures below. (quadrilateral, parallelogram, rectangle, square, or trapezoid.)

Example:



Parallelogram

(24)



(25)



(26)



(27)



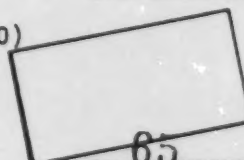
(28)



(29)



(30)



NAME _____ PERIOD _____ DATE _____

Objective: You will be able to recognize and name similarities and differences in quadrilaterals.

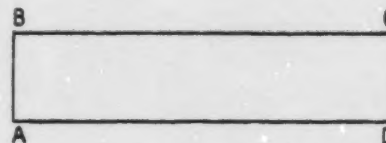
In this lesson you will compare different quadrilaterals to see how they are the same and how they are different. This will help you later when you study area and volume.

Get a packet of plastic geometric figures and a ruler.

- (1) Take out the rectangle, place it on the paper, and put a point at each corner.

Name these points and then connect the points with line segments so you have drawn an exact picture of the rectangle.

Your picture should look like this:



- (2) Which side is opposite side $\overline{AD}$? _____
- (3) Which side measures the same length as $\overline{BC}$? _____
 Mark a point (name it E) midway between point B and point C.
 Mark a point (name it F) midway between point A and point D.
 Use a ruler to draw line segment EF.
- (4) Is the distance from E to F the same as the distance from B to A? _____
- (5) Is the distance from C to D the same as the distance from both EF and AB? _____
- (6) Write two facts about sides $\overline{BC}$ and $\overline{AD}$.
 1) _____
 2) _____
- (7) Write two facts about sides $\overline{AB}$ and $\overline{CD}$.
 1) _____
 2) _____
- (8) If you had to describe the four corners, what would you say?

- (9) What is true of all the corners? _____
- (10) What is true of the opposite corners? _____
- (11) Now draw another rectangle nearly the same shape but a little smaller.

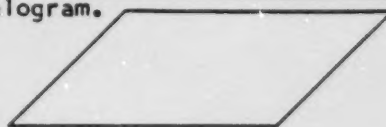
- (12) What statements can you make about the sides and corners of this new rectangle?

- (13) Select the plastic square. Place it on the paper and mark a point at each corner. Draw line segments between the points so you get a picture of the plastic model.

Compare its corners and sides carefully to the things you learned about the rectangle.

- (14) How is the square different from the rectangle? _____

- (15) How is the square the same as the rectangle? _____
 Pick up the plastic model of the parallelogram.
 It's the model that looks like this.



- (16) How is it different from the square? _____

- (17) How is it the same? _____
 Compare it to the rectangle.

- (18) How is it different? _____

- (19) How is it the same? _____
 Now take the rhombus. It looks like a diamond.
 Compare it to the parallelogram.



- (20) How is it different? _____

- (21) How is it the same? _____
 Compare it to the square.

- (22) How is it different? _____

- (23) How is it the same? _____

- (24) You have worked with four different geometric figures. If you had to put the four into two groups of those most nearly alike, which pairs would you put together?
 _____ and _____

_____ and _____

- (25) The last plastic model with four sides is a trapezoid. Compare it carefully to the other four. Write down two ways it is different from the first four you studied. 1) _____

2) _____

- (26) Write down two things that are true of all the models you have studied so far.

1) _____

2) _____

Name _____ Period _____ Date _____

Objective: You will be able to identify and name the three basic parts of a circle

You know this looks like a circle.



This doesn't look like a circle.



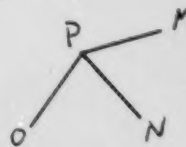
When you finish this lesson, you will be able to explain why one drawing is a circle and the other isn't. Instructions a, b, c, and d below go with drawings A, B, C, and D.

(A)

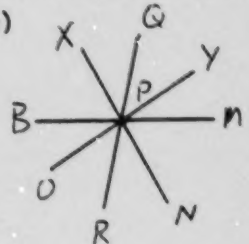
(B)



(C)



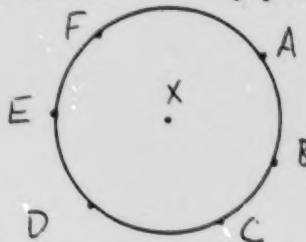
(D)



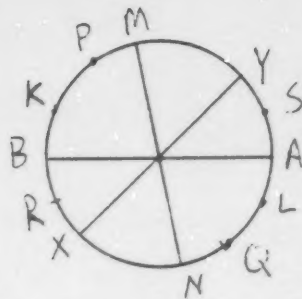
- (a) Begin with a point P.
 - (b) Put a point M some distance from P.
 - (c) Here, 2 more points O and N are placed the same distance from P as M.
 - (d) Now, several more points are drawn. All of them are the same distance from P.
- (1) Now, you draw as many more points as you can between the points already shown on figure (D).
 - (2) You should see now that the set of all the points which are the same distance from a point P forms a circle.



- (3) Here is a circle whose center point is _____.
- (4) Draw a point X any where on the circle.
- (5) Draw the line segment $\overline{YX}$.
- (6) $\overline{YX}$ is called a radius of the circle.
- (7) A line segment from the center of a circle to any point on the circle is called a _____.



- (8) Draw a radius from point X to each of the points A, B, C, D, E, and F.
- (9) Draw and label 5 more points on the circle and draw the radii.
- (10) How many radii do you think a circle might have? _____



The line segment $\overline{BA}$ has its endpoints on the circle and passes through the center of the circle. $\overline{BA}$ is called a diameter of the circle.

(11) Name 2 other diameters which are shown. _____

(12) Draw the diameter $\overline{PQ}$. (13) Draw the diameter $\overline{RS}$. (14) Draw the diameter $\overline{KL}$.

In the circle below, name the line segments as a radius or a diameter.

Example: $\overline{XA}$ is a radius

(15) $\overline{PQ}$ is a _____.

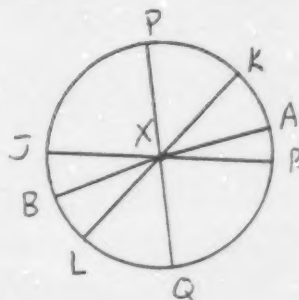
(16) $\overline{BX}$ is a _____.

(17) $\overline{KL}$ is a _____.

(18) $\overline{XJ}$ is a _____.

(19) $\overline{XR}$ is a _____.

(20) $\overline{JR}$ is a _____.



Construction

Use a compass to draw a circle around each point shown.

(21)

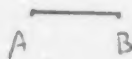
.A

.B

.C

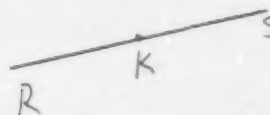
Use a compass to draw circles using the line segments below as radii.

(22)



Use a compass to draw a circle using the segments shown below as diameters.

(23)



1) Draw an example of a quadrilateral

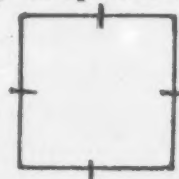
2) Draw an example of a trapezoid

(QA-9)

Give the most specific name for each figure below

(quadrilateral, square, rectangle, trapezoid, rhombus, parallelogram)

3) _____



4) _____



5) _____



(QA-10)

Write sides or angles for the problems below

6) What is the difference between a square and a rhombus? _____

7) What is the difference between a rectangle and a parallelogram? _____

(QA-11)

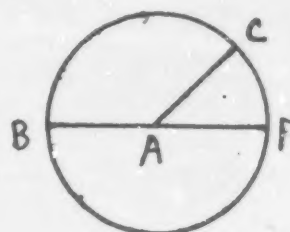
Use these words to fill in the blanks below (Centerpoint, radius, diameter)

8) $\overline{AC}$ is called the _____

9) Point A is called the _____

10) $\overline{BP}$ is called the _____

(QA-12)



- 1) Draw an example of a square. 2) Draw an example of a parallelogram

(QA-9)

Give the most specific name for each figure below

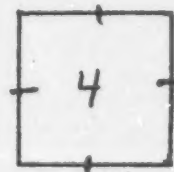
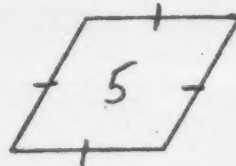
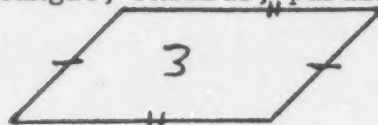
(Quadrilateral, square, rectangle, rhombus, parallelogram, trapezoid)

3) _____

4) _____

5) _____

(QA-10)



Write sides or angles for the problems below

6) What is the same for a square and a rhombus? _____

7) What is the same for a rectangle and a square? _____

(QA-11)

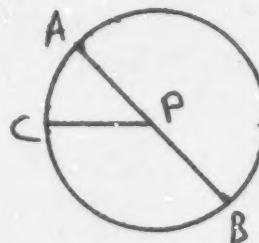
Fill in the blanks below with these words. (Centerpoint, radius, diameter)

8) $\overline{CP}$ is called the _____

9) Point P is called the _____

10) $\overline{AB}$ is called the _____

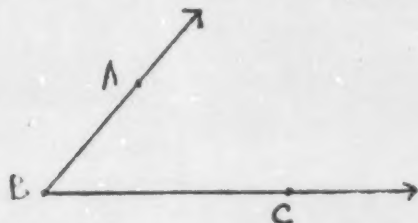
(QA-12)



LEVEL QA POSTTEST
Informal Geometry II

Name _____
Period _____
Date _____

- 1) Get a protractor from the teacher and measure the the angles below $\angle ABC$ measures _____ $^{\circ}$ $\angle MON$ measures _____ $^{\circ}$



(QA-1)



- 2) The sum of the measures of the three angles in a triangle is _____ $^{\circ}$.
- 3) True or False A triangle can have two right angles. _____
- (QA-2)
- 4) In the space below, draw an angle of 55° . Use the protractor.
- 5) In the space below, draw an angle of 125° .

(QA-3)

- 5) Angles 2 and 4 together are called _____ angles.

- 6) $m\angle 1$ _____ $m\angle 3$

(QA-4)

- 7) The measures of a pair of complementary angles add up to _____ $^{\circ}$.
- 8) If the measure of a pair of angles totals 180° , the pair of angles is called _____ angles.

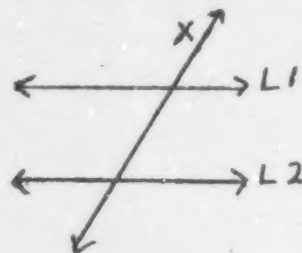
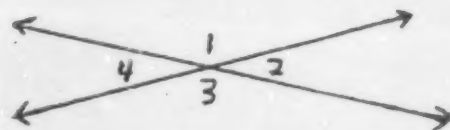
(QA-5)

- 9) Line X is called a _____.

- 10) Line 1 and line 2 are parallel

The symbol used is $L1$ _____ $L2$.

(QA-6)



Posttest QA

11) List a pair of alternate exterior angles. _____

12) List a pair of alternate interior angles. _____

(QA-7)

13) List two pairs of corresponding angles. 1) _____ 2) _____

(QA-8)

14) Quadrilaterals are closed simple polygons with _____ sides.

(QA-9)

Matching: put correct letter inside the figures.

15) a) parallelogram

16) b) rectangle

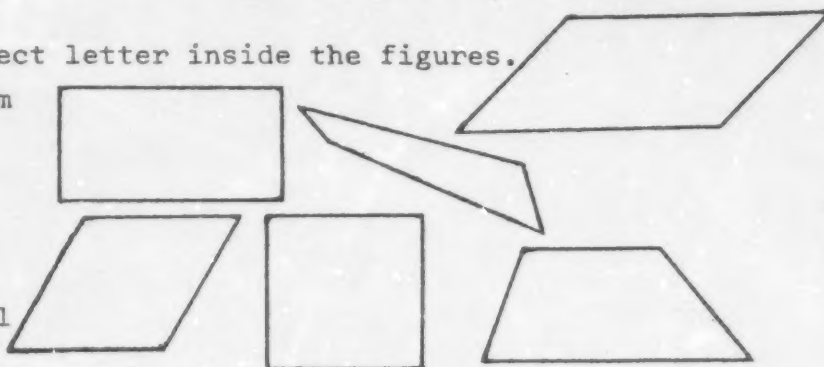
17) c) square

18) d) trapezoid

19) e) rhombus

20) f) quadrilateral

(QA-10)



Write sides or angles for the problems below.

21) What is the same for a rhombus and a square? _____

22) What is the same for a square and a rectangle? _____

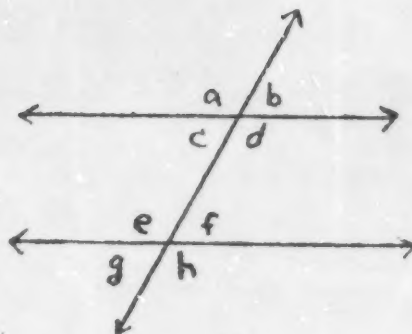
23) What is the same for a rectangle and a parallelogram? _____

(QA-11)

24) The measure from the center of a circle to the outside edge of the circle is called the _____.

25) A line drawn from a point on the outside edge of a circle through the center to the other side of a circle is called the _____.

(QA-12)

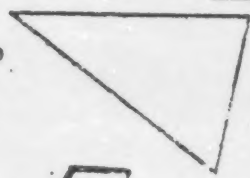


Name _____

Date _____

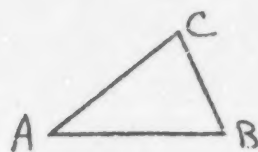
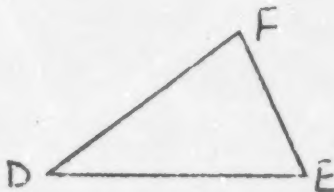
Period _____

LEVEL R PRE-TEST

1. Is  similar to  ? _____ (R-1)

2. Is  similar to  ? _____ (R-1)

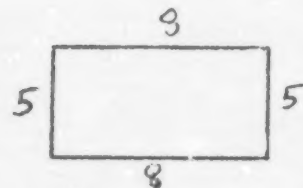
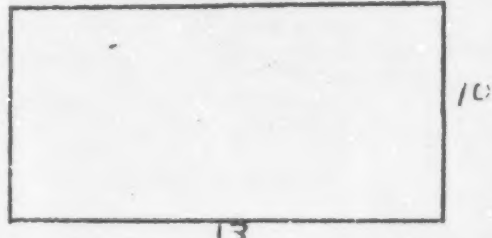
3. Similar figures have the same _____, but not the same _____ . (R-1)

4.  

$\overline{AB}$ corresponds to _____

$\overline{FD}$ corresponds to _____

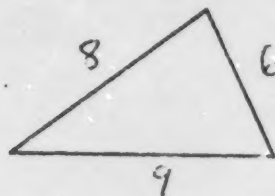
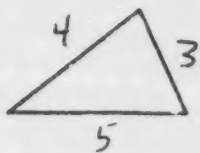
$\overline{BC}$ corresponds to _____ (R-2) 13

5.  

The side 5 units long corresponds to the side _____ units long.

The side 13 units long corresponds to the side _____ units long. (R-2)

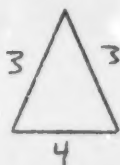
6. Are these two triangles similar? _____



Set up proportions and use cross-multiplication to show whether or not the triangles are similar. (R-3)

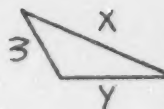
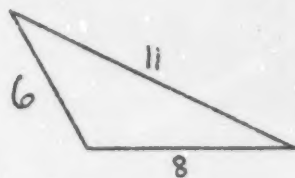
Find the missing sides of these pairs of similar figures.

7. $n =$ _____ (R-4)

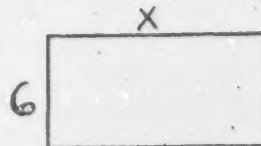
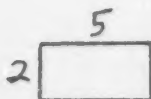


8. $x =$ _____

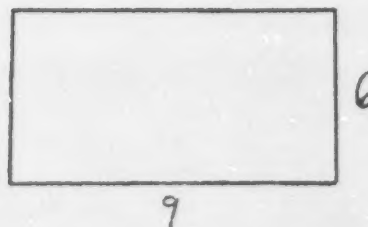
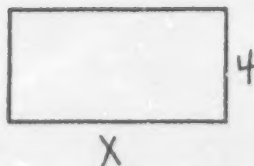
$y =$ _____ (R-4)



9. $x =$ _____ (R-5)



10. $x =$ _____ (R-5)

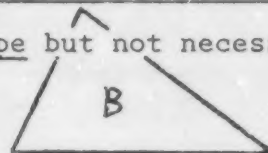
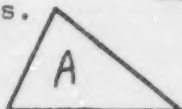


SIMILAR FIGURES R-1

Name _____ Period _____ Date _____

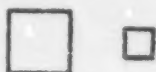
Objectives: You will be able to identify and draw figures that seem to be similar and name sides of triangles by lengths or line segments.

The figures that are exactly alike in shape but not necessarily in size are similar figures.



- 1) Figure A and figure B seem to be exactly alike in _____.
- 2) If figure A and B are exactly the same shape, they are called _____.
- 3) Draw a picture of a figure you think would be similar to the outside edge of a dime.

Do you think the figures below seem similar? _____



- 5) If two figures are _____, they do not need to be the same size but they must be exactly the same shape.

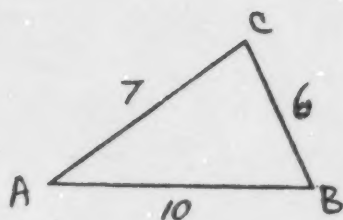
Match the figure in the example column with any similar figure

	Example	a	b	c	d	Answer
6)						a and d
7)						
8)						
9)						
10)						

- 11) Similar figures are determined not by size, but by _____.

R-1 (con't)

figure 1



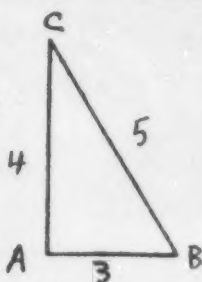
The sides of a triangle have names as well as length. In figure 1:

12) Side $\overline{AB}$ is _____ units long.

Side $\overline{AC}$ is _____ units long.

13) Side $\overline{CB}$ is _____ units long.

figure 2



In figure 2

14) $\overline{CB}$ is _____ units long.

15) $\overline{AC}$ is _____ units long.

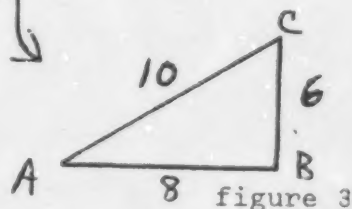
16) $\overline{AB}$ is _____ units long.

In figure 3

17) _____ = 8 units long.

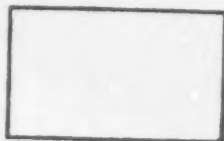
13) _____ = 10 units long.

19) _____ = 6 units long.



Use a straight edge to draw figures similar to the figures given below. Remember, similar means the same shape.

20)



21)



22)



23)



24)

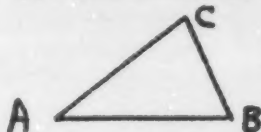
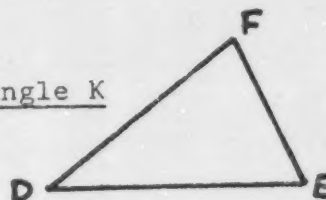


SIMILAR FIGURES R-2

Name _____ Period _____ Date _____

Objectives: You will be able to identify and draw figures that seem to be similar and name corresponding sides of geometric figures.

Here is a picture of two similar triangles.

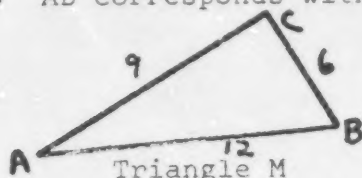
Triangle HTriangle K

Match the sides of H with the sides of K.

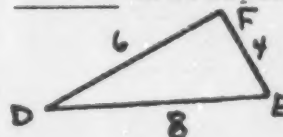
Sides match or correspond if they look like they are in the same position in both triangles.

$\overline{AC}$ corresponds with $\overline{DF}$

- 1) $\overline{AB}$ corresponds with _____ 2) _____ corresponds with $\overline{FE}$.



Triangle M



Triangle N

Name the corresponding sides for triangles M and N.

- 3) $\overline{AB}$ corresponds to _____ 4) _____ corresponds to _____
 5) _____ corresponds to _____
 6) $\overline{AB}$ is 12 units long. What is the length of the side which corresponds to it? _____
 7) $\overline{CB}$ = _____ units long. The side which corresponds to CB is _____ units long.
 8) What is the name of the side 4 units long? _____
 9) What is the length of the side which corresponds to $\overline{DF}$? _____

Draw two similar triangles of different sizes, name the sides and write the sides in triangle R which correspond to the sides in triangle T.

Triangle RTriangle T

- 11) Side _____ corresponds to side _____.
 12) Side _____ corresponds to side _____.
 13) Side _____ corresponds to side _____.

Figures W and X are similar.

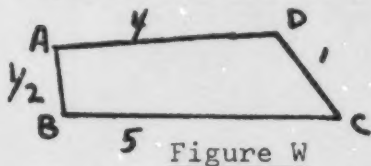


Figure W

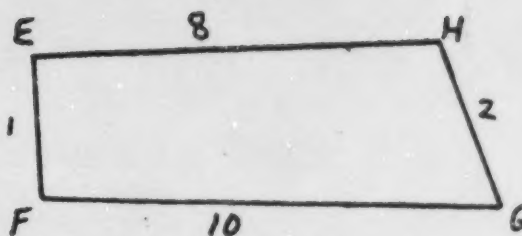
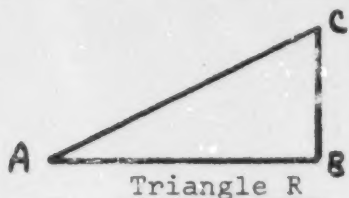
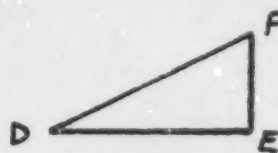


Figure X

- 14) $\overline{DC}$ corresponds to _____.
- 15) $\overline{AB}$ corresponds to _____.
- 16) $\overline{HE}$ corresponds to _____.
- 17) In figure W the side which is 5 units corresponds to the side which is _____ units.
- 18) In figure W the side which is $\frac{1}{2}$ unit corresponds to the side which is _____ units.
- 19) In figure X the side which is 8 units corresponds to the side which is _____ units.



Triangle R

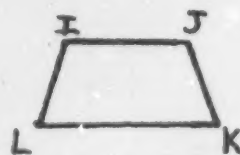
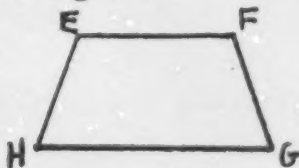


Triangle S

The two triangles are similar, write the corresponding sides.

- 20) _____ corresponds to _____.
- 21) _____ corresponds to _____.
- 22) _____ corresponds to _____.

Below we see three similar figures:



- 23) Write at least 6 more correspondents for the figures above.

- a. $\overline{AB}$ corresponds to $\overline{IF}$ e. _____ to _____
- b. $\overline{BC}$ corresponds to $\overline{FG}$ f. _____ to _____
- c. _____ to _____ g. _____ to _____
- d. _____ to _____ h. _____ to _____

SIMILAR FIGURES R-3

Name _____ Period _____ Date _____

Objectives: You will be able to identify corresponding sides and write them as ratios, and verify that triangles are similar by using cross products.

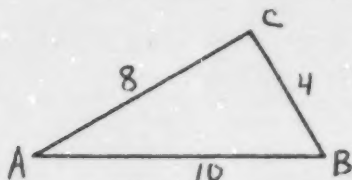


Figure 1

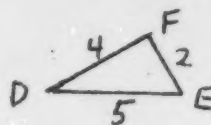


Figure 2

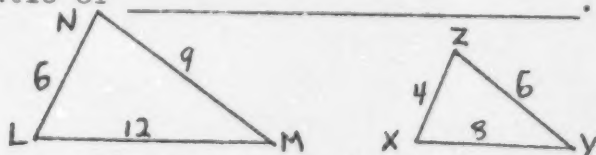
- 1) The triangles in fig. 1 and fig. are similar. This means they have the same _____.
- 2) In the lesson just before this one, you wrote correspondents for the sides of similar figures. In the above triangles, $\overline{AC}$ corresponds to $\overline{DF}$, $\overline{AB}$ corresponds to _____ and _____ corresponds to $\overline{FE}$.
- 3) $\overline{AC}$ corresponds to $\overline{DF}$, so 8 corresponds to 4. We can write this as: $\frac{\overline{AC}}{\overline{DF}} = \frac{8}{4}$ (This should be read $\overline{AC}$ is to $\overline{DF}$ as 8 is to 4).

Complete the following: (with numerical ratios)

$$\frac{\overline{AB}}{\overline{DE}} = \frac{\overline{CB}}{\overline{FE}} =$$

- 4) Simplify each of the three ratios in #3. They each reduce to a ratio of _____.

5)



These triangles have the same shape, so they are _____ triangles.

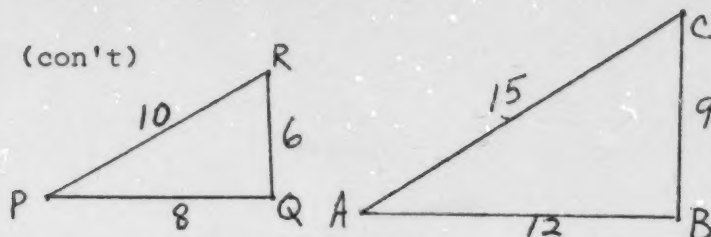
Complete these statements and simplify the ratios:

$$\frac{\overline{LM}}{\overline{XY}} = \frac{12}{6} = \frac{\overline{NM}}{\overline{ZY}} = \frac{9}{3} = \frac{\overline{LN}}{\overline{XZ}} = \frac{6}{4} =$$

- 6) Do you see that all of the ratios in #5 are equal, because each one reduces to a ratio of $\frac{3}{2}$? Then, the ratios of corresponding sides of similar triangles are _____.

R-3 (con't)

7)



These triangles have the same ratios of corresponding sides, so they are similar. Write the ratios of corresponding sides, using the lengths of each segment.

$$\frac{10}{12} = \frac{6}{9} = \frac{8}{12}$$

- 8) In #7, each ratio is equal to $\frac{5}{6}$ when simplified. So ratios of corresponding sides of similar triangles are $\frac{5}{6}$.
- 9) Do you remember a way of checking whether or not two ratios are equal? cross-multiplication
- 10) is $\frac{6}{9} = \frac{8}{12}$? Yes Yes, if their cross-products are equal.

$$\frac{6}{9} = \frac{8}{12}$$

$$9 \times 8 = 12 \times 6$$

$$72 = 72$$

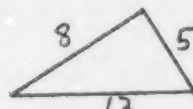
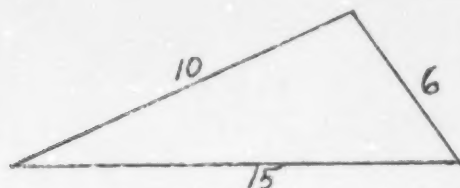
- 11) Since both products are the same (72), the ratios are equal.



These two triangles are similar if the cross-product of their corresponding sides are equal. Let's check by cross-multiplication if they are actually similar.

12) $\frac{6}{8} = \frac{12}{16}$ $6 \times 12 = 8 \times \underline{12}$ 13) $\frac{9}{12} = \frac{12}{16}$ $12 \times 12 = 9 \times \underline{16}$

14) $\frac{8}{12} = \frac{12}{16}$ $8 \times 12 = 12 \times \underline{16}$ 15) If each cross-product is true the triangles are similar.



These triangles seem to be similar. To be sure, we will set up three pairs of ratios and check to see if the cross-products are equal for each pair.

16) $\frac{10}{12} = \frac{8}{12}$ 17) $\frac{6}{5} = \frac{15}{12}$

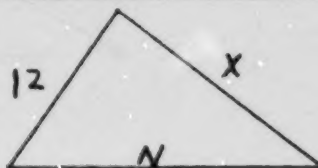
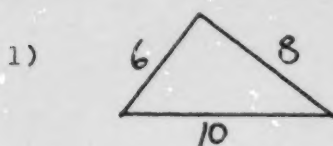
18) $\frac{15}{12} = \frac{6}{5}$

- 19) Are the triangles similar? Yes

SIMILAR FIGURES R-4

Name _____ Period _____ Date _____

Objective: You will be able to solve for lengths of sides in similar triangles.



These triangles are similar, so their corresponding sides have equal ratios. That is,

$$\frac{6}{12} = \frac{10}{n}$$

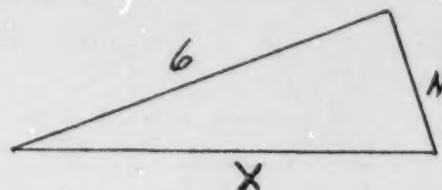
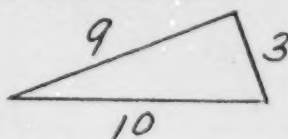
We can find n by using cross-multiplication.

$$\frac{6}{12} \times \frac{10}{n} \quad 6 \times n = 12 \times 10 \quad 6n = 120 \quad n = \underline{\hspace{2cm}}$$

2) in the above triangles, we can also find X .

$$\frac{6}{12} \times \frac{8}{X} \quad 6 \times X = 12 \times 8 \quad 6X = \underline{\hspace{2cm}} \quad X = \underline{\hspace{2cm}}$$

3) These triangles are similar.



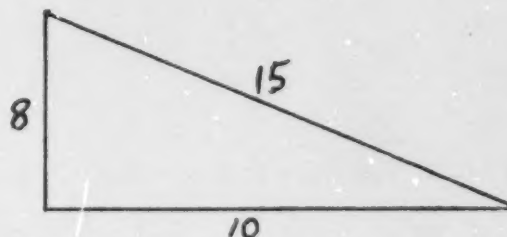
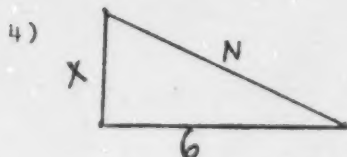
Find N and X .

$$\frac{9}{3} \times \frac{N}{X}$$

$$9 \times n = \underline{\hspace{2cm}} \times \underline{\hspace{2cm}}$$

$$9n = \underline{\hspace{2cm}}$$

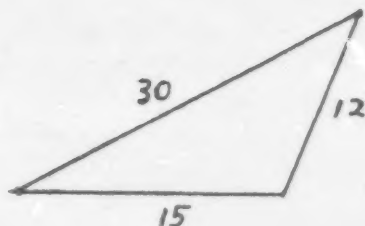
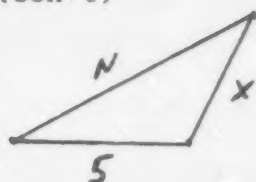
$$n = \underline{\hspace{2cm}} \quad X = \underline{\hspace{2cm}}$$



If these triangles are similar, $n = \underline{\hspace{2cm}}$, $X = \underline{\hspace{2cm}}$.
(Show your work)

R-4) (con't)

5)



These triangles are similar, find the lengths of both sides.

a. $\frac{n}{30} = \frac{5}{15}$

b. $\frac{x}{12} = \frac{5}{15}$

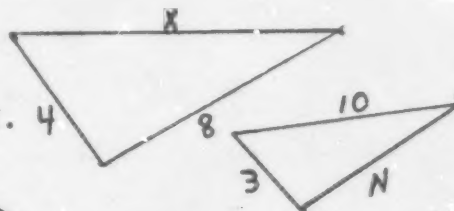
6) These triangles are similar.

a. To find n:

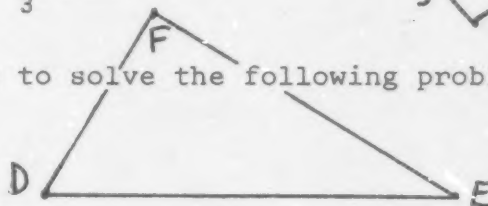
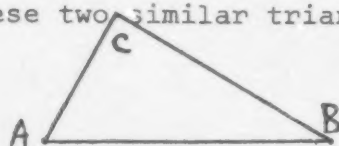
$$\frac{4}{3} = \frac{n}{10}$$

b. To find X:

$$\frac{4}{3} = \frac{X}{8}$$



Use these two similar triangles to solve the following problems:



	AC	AB	CB	DF	DE	FE
7)	2	4	3	4		
8)	3	7	5	9		
9)		9		8	12	12

(show your work here)

Solve for the missing sides. These triangles are similar.

10) $\frac{3}{9} = \frac{x}{18}$

$x = 6$

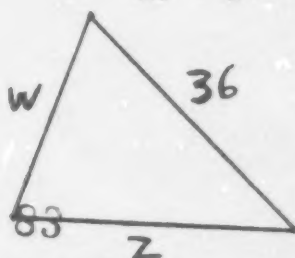
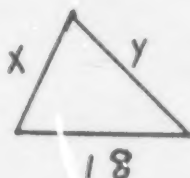
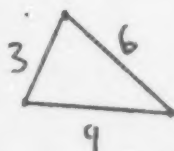
11) $\frac{3}{6} = \frac{x}{y}$

12) $\frac{3}{9} = \frac{x}{18}$

13) $\frac{x}{y} = \frac{w}{36}$

14) $\frac{x}{18} = \frac{w}{z}$

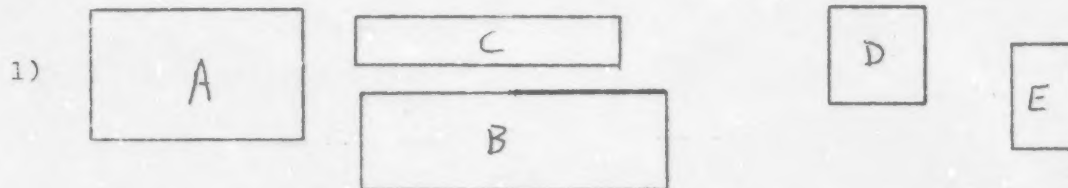
15) $\frac{y}{18} = \frac{36}{z}$



SIMILAR FIGURES R-5

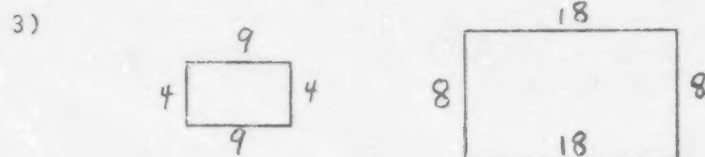
Name _____ Period _____ Date _____

Objective: You will be able to solve for the length of the sides of similar rectangles.



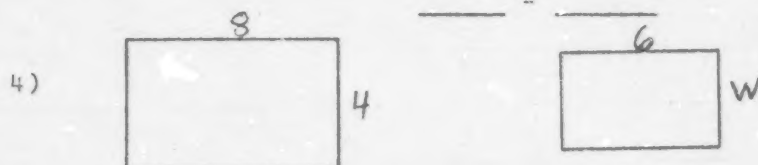
All of these figures are rectangles. One of them is a special rectangle in which all of the sides have the same length. Which one? _____ Yes (d) is a square.

- 2) Similar rectangles have the same shape. Do any of the rectangle in #1 seem to be similar? _____ If so, which ones? _____



These rectangles are similar. The ratio of the widths is $\frac{4}{8}$. The ratio of the lengths is _____. Are these ratios equal? _____ **Yes**, because their cross-products are equal.

Show this. $\frac{4}{8} = \frac{9}{18}$
 $4 \times \underline{\quad} = \underline{\quad} \times 9$



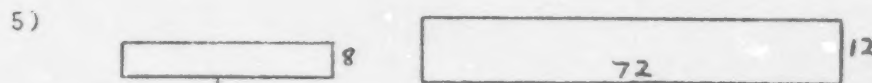
If these rectangles are similar, the ratio of the widths will be equal to the ratio of the lengths. Find the width of the second rectangle.

$$\frac{4}{8} = \frac{6}{w}$$

$$8 \times w = 4 \times 6$$

$$8w = \underline{\quad}$$

$$w = \underline{\quad}$$

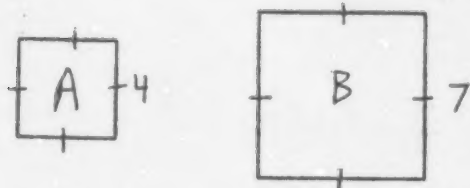


These rectangles are similar. Set up the equal ratios and find the length of the first rectangle. (show your work)

$$\frac{L}{72} = \frac{8}{12}$$

R-5 (con't)

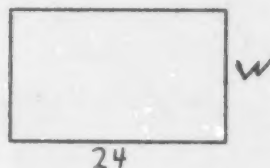
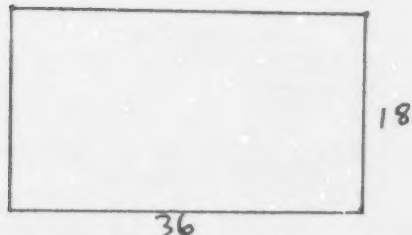
6)



What is the ratio of the widths of square "A" to square "B"?

What is the ratio of their lengths?

7)



The rectangles are similar. Find the width of the smaller rectangle. Show your work below.

Two rectangles are similar. Find the missing length or width. (show your work below)

	Length of 1st Rectangle	Width of 1st Rectangle	Length of 2nd Rectangle	Width of 2nd Rectangle
8)	12	9	20	
9)		9		10
10)	16	11		11
11)	45		50	25

work here

LEVEL R CHECKPOINT

Name _____

Period _____

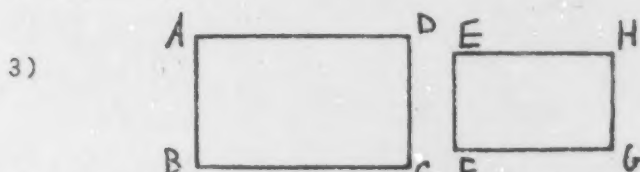
Similar Figures

Name _____

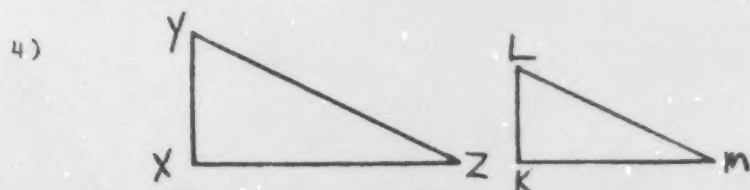
- 1) Similar figures have the same _____, but not the same _____.
- 2) Draw a similar figure to the figure given below.



(R-1)



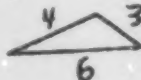
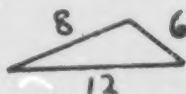
- a) $\overline{BC}$ corresponds to _____
- b) $\overline{EF}$ corresponds to _____



- a) $\overline{KL}$ corresponds to _____
- b) $\overline{YZ}$ corresponds to _____

(R-2)

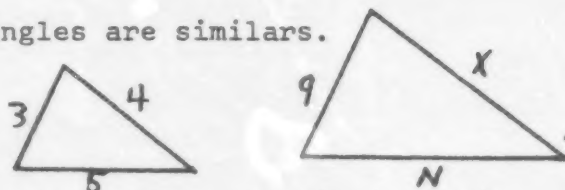
- 5) The ratio of corresponding sides of similar triangles are _____.
- 6) Are these two triangles similar? _____



Set up proportions and use cross-multiplication to show whether or not the triangles are similar. (R-3)

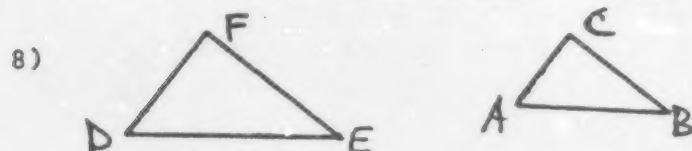
Level R Checkpoint (con't)

- 7) These triangles are similar.



Using ratios, solve for the missing sides.

$N = \underline{\hspace{2cm}}$ $x = \underline{\hspace{2cm}}$

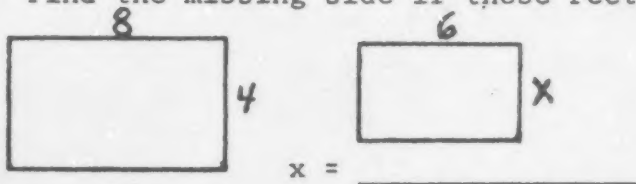


ABC is similar to DEF. Complete chart below.

$\overline{AB}$	$\overline{BC}$	$\overline{CA}$	$\overline{DE}$	$\overline{EF}$	$\overline{FD}$
4	3	2	8	—	—

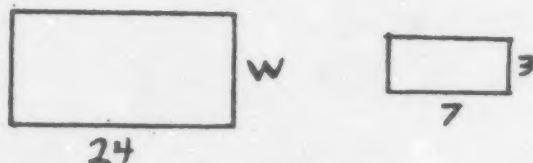
(R-4)

- 9) Find the missing side if these rectangles are similar.



$x = \underline{\hspace{2cm}}$

- 10)



$w = \underline{\hspace{2cm}}$

(R-5)

LEVEL R A-CHECKPOINT

Name _____

Period _____

Date _____

Similar Figures

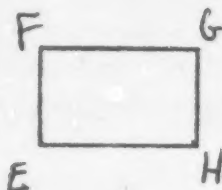
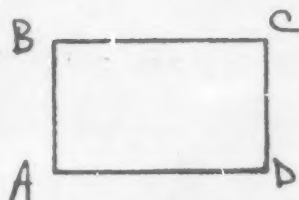
1) Similar figures have the same _____.

2) Draw a similar figure to the figure given below.



(R-1)

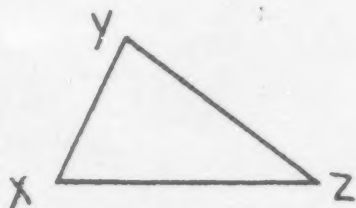
3)



a) $\overline{GH}$ corresponds to _____

b) $\overline{AD}$ corresponds to _____

4)



a) $\overline{YZ}$ corresponds to _____

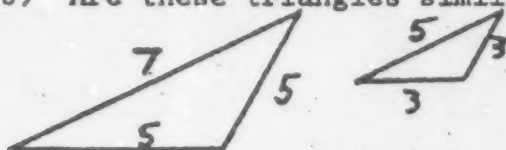
b) $\overline{MK}$ corresponds to _____

(R-2)

5) If the ratios of corresponding sides of two triangles are equal, the triangles are _____.

Level R A-Checkpoint (con't)

- 6) Are these triangles similar? _____



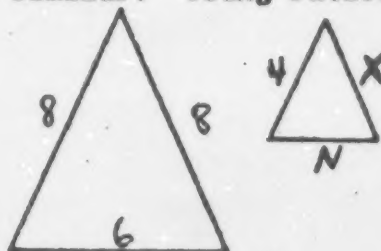
Set up proportions and use cross-multiplication to show whether or not the triangles are similar.

(P-3)

- 7) These triangles are similar. Using ratios, solve for N and X.

N = _____

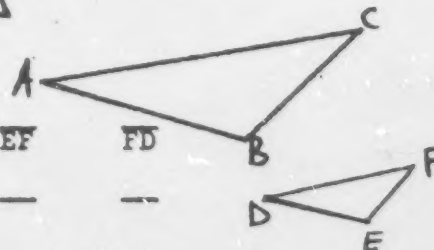
X = _____



- 8) ABC is similar to DEF

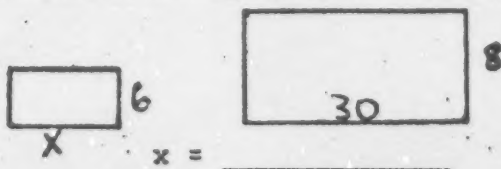
Complete this chart.

AB	BC	CA	DE	EF	FD
6	10	12	3	—	—



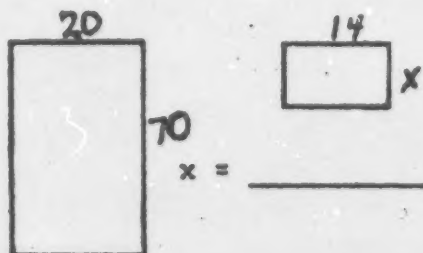
(R-4)

- 9) Find the missing side if these rectangles are similar.



x = _____

10)



x = _____

(R-5)

Name _____

Date _____

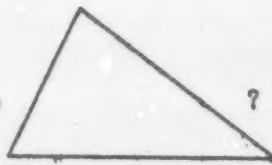
Period _____

LEVEL R POST TEST

1. Is

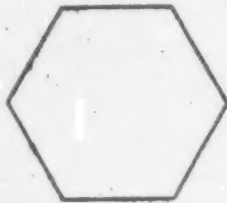


similar to



? _____ (R-1)

2. Is



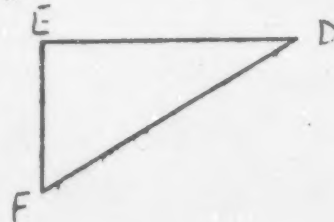
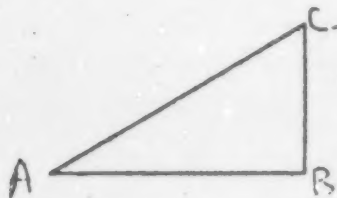
similar to



? _____ (R-1)

3. Similar figures have the same _____. (R-1)

4.

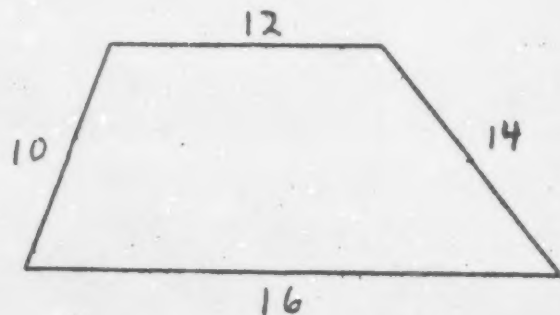
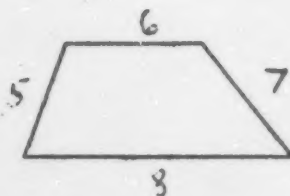


$\overline{AB}$ corresponds to _____

$\overline{FE}$ corresponds to _____

$\overline{AC}$ corresponds to _____ (R-2)

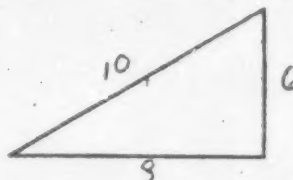
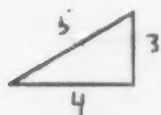
5.



The side 7 units long corresponds to the side _____ units long.

The side 16 units long corresponds to the side _____ units long.
(R-2)

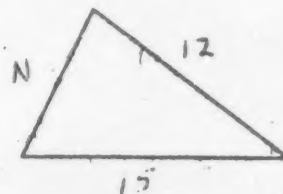
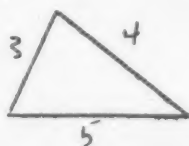
6. Are these two triangles similar? _____



Set up proportions and use cross-multiplication to show whether or not the triangles are similar. (R-3)

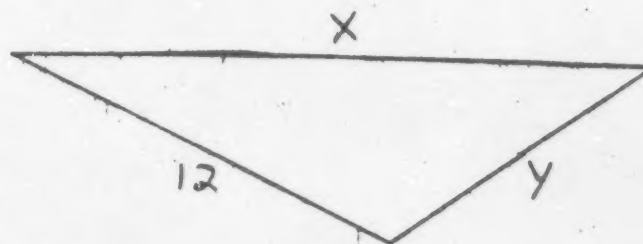
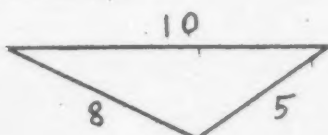
Find the missing sides of these pairs of similar figures.

7. $n =$ _____ (R-4)

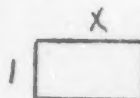
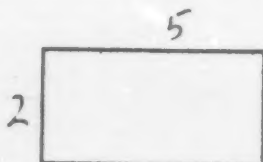


8. $x =$ _____

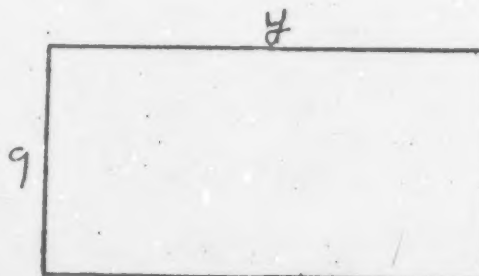
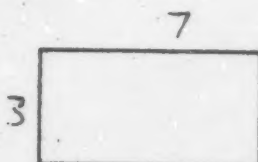
$y =$ _____ (R-4)



9. $x =$ _____ (R-5)



10. $y =$ _____ (R-5)



LEVEL 5 PRE-TEST

Name _____

Period _____

Date _____

1. What "standard unit" would you use to measure the length of a pencil? _____ (S-1)

2. How many one-foot rulers make up a yardstick? _____ (S-1)

3. Which measure of length would you use to measure the length of a football field? _____ (S-2)

4. How many $\frac{1}{2}$ inches are there in 4 inches? _____ (S-2)

5. Measure this line segment to the nearest $\frac{1}{2}$ inch. (S-2)

A _____ B $\overline{AB} =$ _____ inches

6. How many $\frac{1}{4}$ inches in $\frac{1}{2}$ inch? _____ (S-3)

7. Measure this line segment to the nearest $\frac{1}{4}$ inch. (S-3)

C _____ D $\overline{CD} =$ _____ inches

8. How many $\frac{1}{8}$ inches in $\frac{1}{2}$ inch? _____ (S-4)

9. Measure this line segment to the nearest $\frac{1}{8}$ inch. (S-4)

E _____ F $\overline{EF} =$ _____ inches

10. How many $\frac{1}{16}$ inches are there in 1 inch? _____ (S-5)

11. Measure this line segment to the nearest $\frac{1}{16}$ inch. (S-5)

G _____ H $\overline{GH} =$ _____ inches

12. 4 feet = _____ inches. (S-6)

13. 13 yards = _____ feet. (S-6)

14. 108 inches = _____ feet. (S-6)

The scale on a map reads 1" = 50 miles.

15. $2\frac{1}{2}$ inches on the map represents _____ miles. (S-7)

16. Add: (S-8)

1 yard 5 feet 3 inches
3 feet 10 inches

17. Subtract: (S-8)

2 yards 1 foot
2 feet 8 inches

18. Multiply: (S-8)

$$\begin{array}{r} 3 \text{ yards } 1 \text{ foot } 7 \text{ inches} \\ \times 2 \\ \hline \end{array}$$

19. Divide: (S-8)

$$4 \overline{) 5 \text{ feet } 8 \text{ inches}}$$

20. 1 gallon = _____ quarts. (S-9)

21. 2 pints = _____ cups. (S-9)

22. 1 quart = _____ liquid ounces. (S-9)

23. Change 32 ounces to pounds. _____ (S-10)

24. $2\frac{1}{2}$ tons = _____ pounds. (S-10)

25. Add: (S-10)

$$\begin{array}{r} 3 \text{ tons } 1800 \text{ pounds} \\ 2 \text{ tons } 1500 \text{ pounds} \\ \hline \end{array}$$

26. Subtract: (S-10)

$$\begin{array}{r} 3 \text{ tons } 100 \text{ pounds} \\ 1 \text{ ton } 500 \text{ pounds} \\ \hline \end{array}$$

27. What part of a day is 6 hours? _____ (S-11)

28. Change 5 minutes to seconds. _____ seconds (S-11)

29. Write the total of the following coins: (S-12)

1 quarter, 3 dimes, 2 nickels, and 7 pennies. _____

30. If you spent \$3.52 on groceries, and handed the clerk a ten dollar bill. What currency (dollar bills) and coins would you receive for change? _____ five dollar bill,

_____ one dollar bills, _____ half dollars, _____ quarters, _____ dimes, _____ nickels, _____ pennies. (S-12)

MEASUREMENT S - 1 (English System)

Name _____ Period _____ Date _____

Objective: You will be able to use simple measuring units to tell lengths.

When man first started measuring things, he measured them with tools that were readily at hand. The first things that he used were probably his hands and fingers. Use your hands and fingers to measure some things. Measure the line segments below by using your thumb width as the unit of measure.

- (1)  Thumb widths _____
- (2)  Thumb widths _____
- (3)  Thumb widths _____

Now let's use the width of the little finger to measure some line segments.

- (4)  Little-finger widths _____
- (5)  Little-finger widths _____
- (6)  Little-finger widths _____

Next, let's use the width of the hand as a unit of measure.

- (7) Width of your desk top in hand widths _____
- (8) Width of this paper in hand widths _____
- (9) Length of your forearm in hand widths _____
- (10) Do you suppose your neighbor has the same answers as you do? _____

Compare your answers with a classmate's and see if you got the same answers.

Did you agree on all your answers? _____

- (11) If not, suggest something that we could do to make sure we all get the same answers when measuring objects? _____
- (12) If you suggested we all use the same measuring unit, you suggested the same solution that men did many years ago. Let's now use the unit of measure at the bottom of the page to measure the following line segments. Trace it and use it as the unit of measure.

- (13) _____ Franklin Units _____
- (14) _____ Franklin Units _____
- (15) _____ Franklin Units _____
- (16) _____ Franklin Units _____
- (17) _____ Franklin Units _____
- (18) Width of this paper in Franklin Units _____

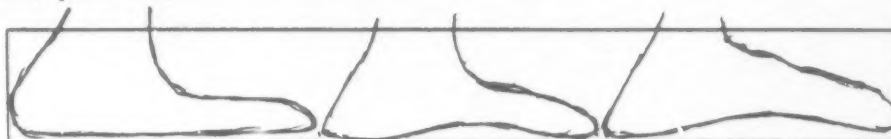
Congratulations! You have just made history by standardizing a unit of measure - the Franklin Unit.

This shall be know as the Franklin Unit



Name _____

- (19) Is your foot really a foot? _____
- (20) My foot is (longer - shorter) than a foot. How much shorter or longer? _____
- (21) Do three of your feet equal one yard? _____
- (22) Do three "1 foot" rulers equal one yard? _____
- (23) When we measure we compare the length of some object to the length of a 'standard unit'.
- (24) What "standard unit" would you use to measure
- (a) a pencil _____
- (b) how long your living room is _____
- (25) What object do you use very often in school which is a "standard unit" of measure? _____
- (26) Look at this picture.



3 feet = 1 yardstick

- (27) Could the yardstick in the picture be used as a "standard unit" of measure? _____
- (28) Would the yardstick in the picture always be equal in length to the yardstick in the classroom? _____
- (29) Which one is the "standard unit" for measuring a yard? _____
- (30) First Experiment: Determine the number of "your" feet it is across the room. How many? _____
- (31) Second Experiment: Determine the number of "foot rulers" across the room. How many? _____
- (32) Which "unit of measurement", your foot or the foot ruler would be the better answer? _____
- (33) Which answer would a person from anywhere in the world be more apt to accept? _____
- (34) Which unit of measure would always give the same answer, even if you changed to another foot ruler and another person's foot? _____
- (35) What does "standard unit" mean? _____

Below are some "standard units" of measurement.

1 mile	=	5, 280 feet or 1760 yards (yd.)
1 yard	=	3 feet (ft.)
1 foot	=	12 inches (in.)

MEASUREMENT (English System) S-2

Name _____ Period _____ Date _____

Objective: You will be able to measure with a 12-inch ruler that is graduated in half-inches.

Four of the standard linear units of measure are the inch, foot, yard and mile.

1 foot = 12 inches

1 yard = 3 feet

1 mile = 5280 feet or 1760 yards

In measuring, we use the unit that seems best for the object being measured.

Which unit of length (inch, foot, yard, or mile) would you use to measure each of the following?

- (1) Pencil _____
- (2) Football field _____
- (3) Distance to the moon _____
- (4) Length of a classroom _____
- (5) Thickness of a book _____
- (6) Now look at your ruler. How many numbers are there on the ruler? _____
The distance between any two consecutive numbers is called one inch.
- (7) How many inches are there on a ruler? _____
- (8) How many inches are between the 3-inch mark and the 4-inch mark? _____
- (9) How many inches are between the 3-inch mark and the 5-inch mark? _____
- (10) How far is it from the 2-inch mark to the 5-inch mark? _____
- (11) How far is it from the 3-inch mark to the 8-inch mark? _____
- (12) How many inches are there on the ruler? _____
- (13) You have probably noticed by now that each inch is divided into smaller units of length, called half-inches. How many half-inches are there in 1 inch? _____
- (14) How many half-inches are there in 2 inches? _____
- (15) How many half-inches are there in 4 inches? _____
- (16) How many half-inches are there in 6 inches? _____
- (17) How many half-inches are there in 12 inches? _____
- (18) Write a rule that will give the number of half-inches in any number of inches.

Try your rule on these:

- (19) 9 inches = _____ half-inches
- (20) 14 inches = _____ half-inches
- (21) 11 inches = _____ half-inches

Name _____

- (22) When using a measuring instrument, you should line up one of the marks on the ruler with one end of the object being measured and then count the number of units between this mark and the mark that lines up with the other end of the object.

Objects can never be measured exactly. The procedure is to measure an object to the nearest unit.

Measure these segments to the nearest half inch with your ruler. The first one done is to show you how.

- (23) A _____ B Length AB 3"
- (24) C _____ e Length CB _____
- (25) Y _____ x Length YX _____
- (26) G _____ B Length GB _____
- (27) X _____ A Length XA _____
- (28) P _____ Q Length PQ _____
- (29) R _____ S Length RS _____

Draw segments with the following lengths:

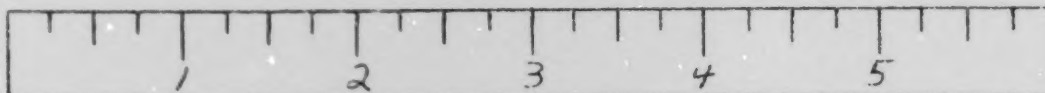
- (30) 5"
- (31) $3\frac{1}{2}"$
- (32) $4\frac{1}{2}"$
- (34) Write the lengths of the line segments in the picture on the spaces provided



MEASUREMENT S - 3 (English System)

Name _____ Period _____ Date _____

Objective : You will be able to measure length with a 12-inch ruler graduated in $\frac{1}{4}$ inches.

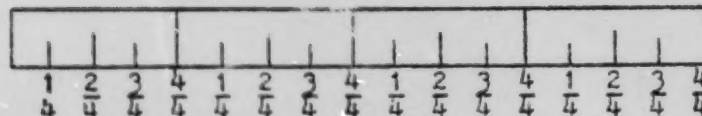
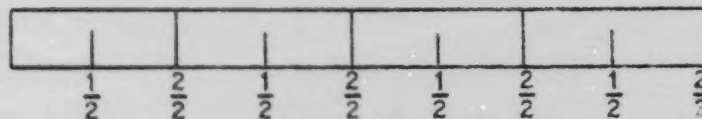
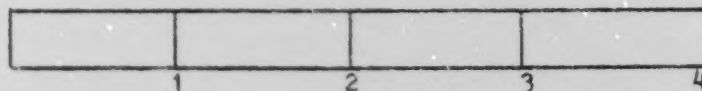


The diagram above shows part of a 12-inch ruler divided into $\frac{1}{4}$'s.

In study packet R-2 you learned to measure with a ruler that was graduated in $\frac{1}{2}$ inches. You found several cases in which you couldn't measure very closely because there weren't enough graduations on your ruler. The ruler you now have has more spaces between each inch mark than the one which you used earlier.

Look at your ruler.

- (1) How many spaces are there between the 2-inch mark and the 3-inch mark? _____
- (2) The answer to problem number 1 should have been 4. Did you get it right? _____
- (3) Notice on your ruler that some of the marks are shorter than other marks. Which marks are the longest: the inch marks, the $\frac{1}{2}$ - inch marks, or the $\frac{1}{4}$ - inch marks? _____
- (4) Some of the marks on your ruler have more than one name. Looking at the diagram below, you will notice that the 1-inch marks have more names than either of the other two. Notice also that the $\frac{1}{2}$ - inch marks have more names than the $\frac{1}{4}$ - inch marks.

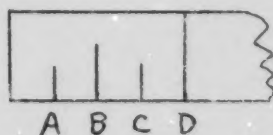


- (5) Which marks on your ruler have the most names? _____
- (6) Write two other names for the 1 inch mark. _____.
- (7) Write one more name for the $\frac{1}{2}$ inch mark. _____
- (8) Looking at only the first inch, which marks on your $\frac{1}{4}$ inch ruler have only one name? _____
- (9) Now that we know the names of the marks on the ruler, let's use the ruler to do some measuring, measure each of the line segments below. (Remember to read your answer to the nearest mark.)

Name _____

- (a) $\overline{A \quad \quad \quad C}$ Measure AC _____
- (b) $\overline{B \quad \quad \quad D}$ Measure BD _____
- (c) $\overline{X \quad \quad \quad Y}$ Measure XY _____
- (d) $\overline{H \quad \quad \quad G}$ Measure HG _____
- (e) $\overline{A \quad \quad \quad B}$ Measure AB _____

- (10) What is the width of this paper? _____
- (11) What is the length of this paper? _____
- (12) How long is your little finger? _____
- (13) How wide is your desk top? _____
- (14) How far from the floor is your desk top? _____
- (15) How long is your pencil? _____
- (16) How long is your foot? _____
- (17) How wide is your foot? _____
- (18) What is your longest hand span? _____
- (19) How wide is your thumb? _____
- (20) Write the names for each unit of measure shown on the ruler below:



Name of unit marked by A _____

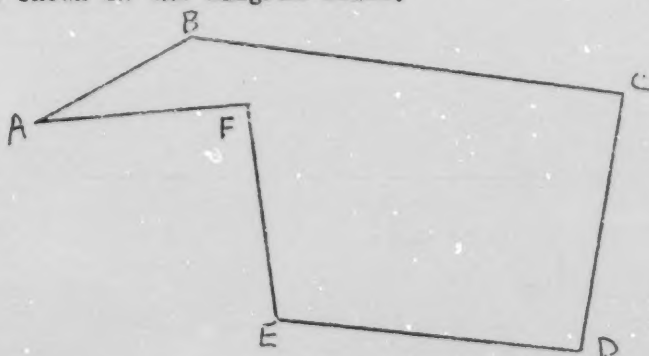
Name of unit marked by B _____

Name of unit marked by C _____

Name of unit marked by D _____

Measure each segment shown in the diagram below.

- (21) AB = _____
- BC = _____
- CD = _____
- DE = _____
- EF = _____
- FA = _____



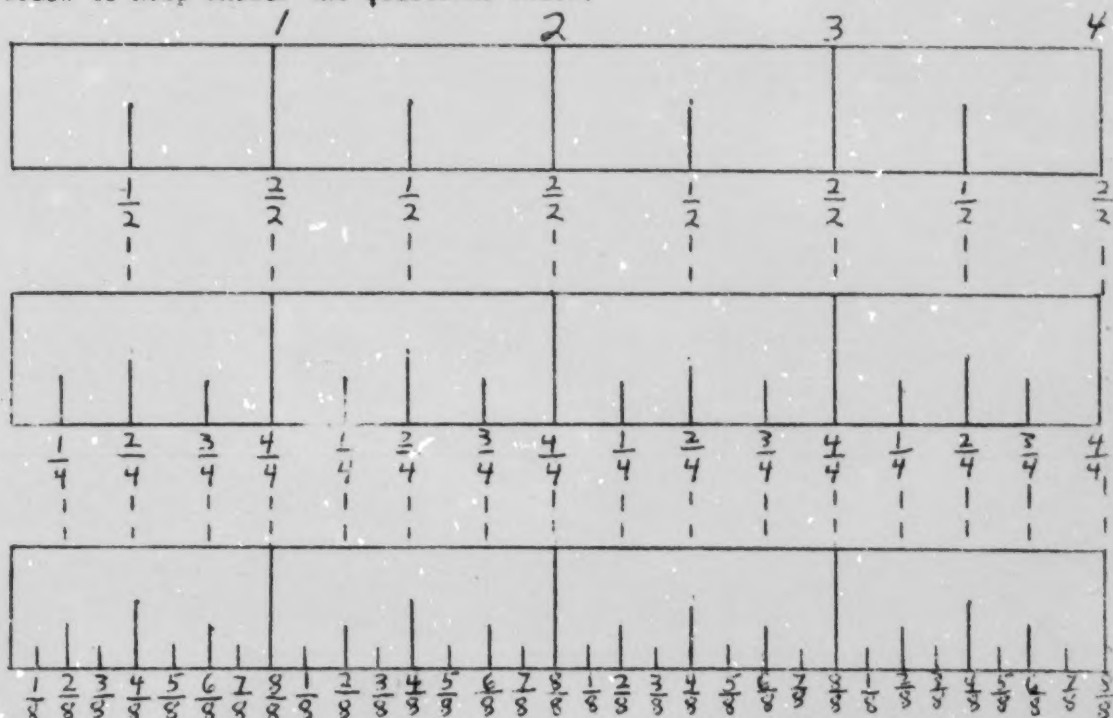
- (22) Total distance around diagram _____

Name _____ Period _____ Date _____

Objective: You will be able to measure length with a 12-inch ruler graduated in $\frac{1}{8}$ inches.

In study level R-3, you learned to measure with a ruler graduated in $\frac{1}{4}$ inches. Today, we are going to use a ruler that has twice as many spaces as the $\frac{1}{4}$ - inch ruler

- (1) Look at the ruler with the most marks on it. How many spaces are there between each inch mark? _____
 - (2) How many $\frac{1}{8}$ inches are there in 1 inch? _____
 - (3) How many $\frac{1}{8}$ inches are there in 2 inches? _____
 - (4) How many $\frac{1}{8}$ inches are there in 4 inches? _____
 - (5) Write a rule that will tell how many $\frac{1}{8}$ inches there are in any number of inches _____
-
- (6) Each mark from zero to 1 and from 1 to 2 and so on is $\frac{1}{8}$ of an inch. How many of these marks in each inch? _____
 - (7) Find the first $\frac{1}{4}$ inch mark on the ruler. How many $\frac{1}{8}$ inch marks in $\frac{1}{4}$ inch? _____
 - (8) Find the first $\frac{1}{2}$ inch mark on the ruler. How many $\frac{1}{8}$ inch marks in $\frac{1}{2}$ inch? _____
 - (9) How many $\frac{1}{4}$ inch marks in the first $\frac{1}{2}$ inch? _____
 - (10) Some of our units of measure have some more names now. Look at the diagram below to help answer the questions below.



Name _____

(11) Write three different names for the inch marks. _____.

(12) Write two different names for the $\frac{1}{2}$ inch marks. _____.(13) Write one more name for the $\frac{1}{4}$ inch mark. _____(14) How many $\frac{1}{8}$ inches are in $\frac{1}{2}$ inch? _____(15) How many $\frac{1}{8}$ inches are in $\frac{1}{4}$ inch? _____Measure these line segments with your $\frac{1}{8}$ " ruler. Put answer above segment.

(16) _____

(17) _____

(18) _____

(19) _____

(20) _____

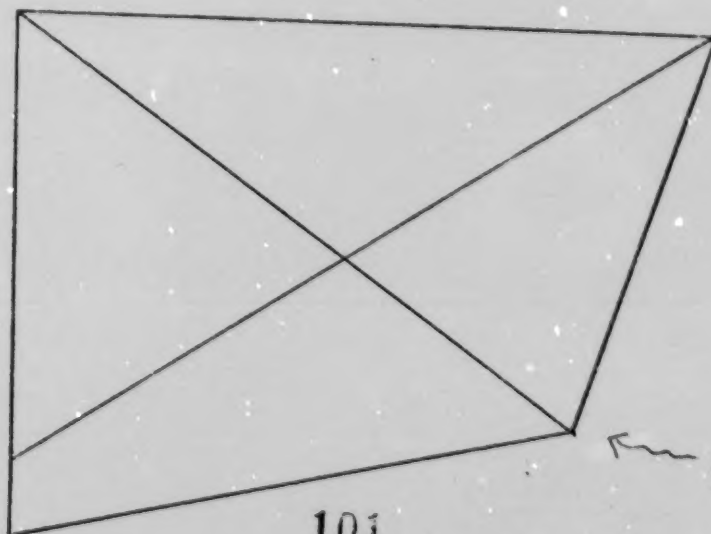
Use your $\frac{1}{8}$ " ruler to draw segments of length shown.(21) $1\frac{5}{8}$ "(22) $\frac{7}{8}$ "(23) $3\frac{3}{4}$ "

(24) 4"

(25) $2\frac{1}{2}$ "(26) $2\frac{3}{8}$ "

(27) How far would a worm crawl if he crawled along every line segment below? _____

Use your ruler to measure the distances.



LEVEL 5 CHECKPOINT 1-4

Name _____

Period _____

Date _____

Measurement-English System

- 1) How many thumb widths is this line segment. _____



- 2) Is your thumb width a standard unit of length? Yes or No

(S-1)

- 3) Which unit would you use to measure the following:
(mile, width, yard, foot)

- a) football field _____ b) Distance to New York _____
c) length of your nose _____
d) height of a fence _____

- 4) How many $\frac{1}{2}$ inch marks are there in

- a) 1 inch _____
b) 4 inches _____

- 5) Measure these line segments to the nearest half inch.

- a) _____ b) _____

(S-2)

- 6) How many $\frac{1}{4}$ inch marks are there in

- a) 1 inch _____ b) 3 inches _____

- 7) Measure these line segments to the nearest $\frac{1}{4}$ inch.

- a) _____ "
b) _____ "

(S-3)

- 8) How many $\frac{1}{8}$ inch marks in

- a) 2 inches _____ b) $\frac{1}{2}$ inch _____

- 9) Measure these line segments to the nearest $\frac{1}{8}$ inch.

- a) _____ "
b) _____ "

(S-4)

Level S Checkpoint 1-4 (con't)

10) Draw the following line segments.

(S-2) a) $1\frac{1}{2}$

(S-3) b) $2\frac{3}{4}$

(S-4) c) $1\frac{7}{8}$

LEVEL S A-CHECKPOINT 1-4

Name _____

Period _____

Date _____

Measurement-English System

1) How many thumb_widths is this line segment?

2) Is your foot a standard unit of measurement? Yes or No

(S-1)

3) Which unit would you use to measure the following:
(inch, foot, yard, mile)

a) length of a pencil _____ b) distance to Concord _____

b) length of a football field _____

c) length of a tabletop _____

4) How many $\frac{1}{2}$ inch marks are there in:

a) 2 inches _____

b) 5 inches _____

5) Measure these line segments to the nearest half inch.

a) _____" b) _____"

(S-2)

6) How many $\frac{1}{4}$ inch marks are there in:

a) $1\frac{1}{2}$ inches _____

b) 4 inches _____

7) Measure these line segments to the nearest $\frac{1}{4}$ inch mark.

a) _____"

b) _____"

(S-3)

Level S A-Checkpoint (con't)

8) How many $\frac{1}{8}$ inch marks in:

a) 1 inch _____

b) $\frac{1}{4}$ inch _____

9) Measure these line segments to the nearest $\frac{1}{8}$ inch.

a) _____

b) _____

(S-4)

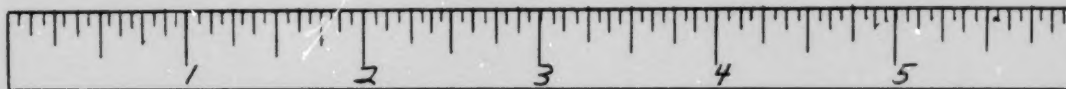
10) Draw the following line segments

(S-2) a) $2\frac{1}{2}$

(S-4) b) $1\frac{3}{8}$

(S-3) c) $3\frac{1}{4}$

Name _____ Period _____ Date _____

Objective: You will be able to use a $\frac{1}{16}$ inch ruler to measure length.The ruler pictured above is marked in $\frac{1}{16}$ inch.

- (1) Each mark from 0 to 1, and 1 to 2, etc. is a $\frac{1}{16}$ inch marking. How many $\frac{1}{16}$ inch spaces in each inch? _____
- (2) Find the first $\frac{1}{8}$ inch mark on the ruler. How many $\frac{1}{16}$ inch spaces in $\frac{1}{8}$ inch? _____
- (3) Find the first $\frac{1}{4}$ inch mark on the ruler. How many $\frac{1}{16}$ inch spaces in $\frac{1}{4}$ inch? _____
- (4) Find the first $\frac{1}{2}$ inch mark on the ruler. How many $\frac{1}{16}$ inch spaces in $\frac{1}{2}$ inch? _____
- (5) How many $\frac{1}{16}$ inch spaces between the 2" and 3" mark? _____
- (6) How many $\frac{1}{16}$ inch spaces between the 2" and the 4" marks? _____
- (7) How many $\frac{1}{16}$ inch spaces between the 4 inch mark and the 7 inch mark? _____
- (8) Do you see an easy way to find how many $\frac{1}{16}$ inch spaces are in any number of inches? _____
- (9) Complete this statement: To find the number of $\frac{1}{16}$ inch spaces in 2 inches, multiply _____ by _____.

Now do these without counting:

- (10) 3 inches = _____ $\frac{1}{16}$ inches.
- (11) 6 inches = _____ $\frac{1}{16}$ inches.
- (12) 5 inches = _____ $\frac{1}{16}$ inches.
- (13) $\frac{1}{2}$ inch = _____ $\frac{1}{16}$ inches.

Use your $\frac{1}{16}$ inch ruler to construct line segments with the length shown.

- (14) $2 \frac{1}{2}$ inches
- (15) $3 \frac{3}{16}$ inches
- (16) $1 \frac{7}{16}$ inches
- (17) $\frac{9}{16}$ inch
- (18) $2 \frac{5}{8}$ inches

Name _____

Use all four of your rulers to answer these questions.

(19) How many $\frac{1}{4}$ inch spaces are in $\frac{4}{16}$ of an inch? _____(20) How many $\frac{1}{16}$ inch spaces are in $\frac{1}{2}$ of an inch? _____(21) $\frac{3}{8}$ inch = _____ $\frac{1}{16}$ inch.(22) $\frac{1}{4}$ inch = _____ $\frac{1}{8}$ inch.

Now let's measure some line segments. Measure each segment four times, once with each ruler. Put your answers in the chart below.

A _____ B

C _____ D

E _____ F

G _____ H

	Segment	Length using $\frac{1}{2}$ in. ruler	Length using $\frac{1}{4}$ in. ruler	Length using $\frac{1}{8}$ in. ruler	Length using $\frac{1}{16}$ in. ruler
(23)	AB				
(24)	CD				
(25)	EF				
(26)	GH				

Use your $\frac{1}{16}$ " ruler only to find the total distance from A around the diagram back to A.

(27) AB = _____

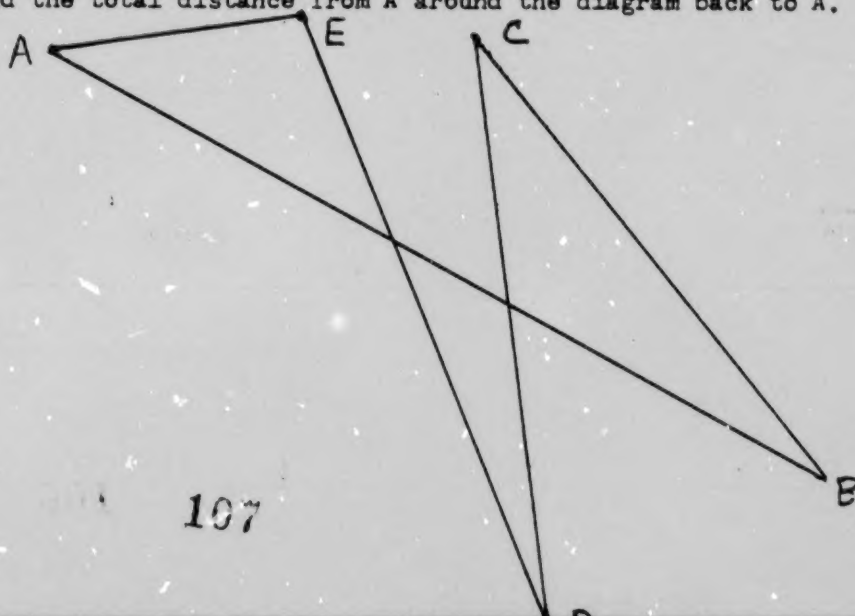
(28) BC = _____

(29) CD = _____

(30) DE = _____

(31) EA = _____

(32) Total _____



5-6
MEASUREMENT **A - 1** (English System)

Name _____ Period _____ Date _____

Objectives: You will be able to work with larger units of measure and to change from one unit of measure to another.

Twelve inches end-to-end make up a longer unit of measure: a foot. Another name for a 12" ruler could be the 1-foot ruler. Instead of using the word foot, we could use a single mark:

1 foot = 1' or a short form such as 1 foot = 1 ft.

Get a yardstick from the teacher and examine it.

The yard is divided into 3 feet and each foot into 12 inches.

The inches, themselves, have also been subdivided into $\frac{1}{2}$ " , $\frac{1}{4}$ " and $\frac{1}{8}$ " .

A yard has 3 divisions called feet.

- (1) 1 yard is the same measure as _____ feet.
- (2) 1 foot is the same measure as _____ inches.
- (3) 2 feet is the same measure as _____ inches.
- (4) 36 inches is the same measure as _____ yard.

Use the yardstick to measure from the front to the back of this classroom.

- (5) How many yards is this length? _____ (nearest yard)
- (6) How many feet is this length? _____ (nearest foot)
- (7) Does the length in yards x 3 equal the number of feet? _____

If not, explain _____

Now measure the width of the classroom.

- (8) How many yards is this width? _____
- (9) How many feet is this width? _____
- (10) Does the width in yards x 3 equal the number of feet? _____

If not, explain _____

If you were to measure the distance from Los Angeles to San Diego you would want a different unit than the inch, foot, or yard. For great length, we use a unit called the mile. There are 5280 feet in each mile.

There are other units of length that you will learn later. Now that you have learned about the 4 basic units (inch, foot, yard, mile) can you answer these questions?

Which unit (inch, foot, yard, mile) would you most likely use to answer these questions?

- (11) How long is a pencil? _____
- (12) How tall is a flagpole? _____
- (13) How far is a footrace? _____
- (14) What is the distance to the sun? _____

Name _____

(15) What is the length and width of a carpet? _____

Let's recall some numbers.

(16) How many inches are in 1 foot? _____

(19) How many feet are in 2 yards? _____

(17) How many feet are in 1 yard? _____

(20) How many feet in 10 yards? _____

(18) How many inches are in 2 feet? _____

It is sometimes necessary to change lengths from one unit to another.
Remember the comparison table

1 foot = 12 inches
1 yard = 3 feet or 36 inches
1 mile = 5280 feet or 1760 yards

To change from a smaller to a larger unit, divide by the number underlined.
To change from a larger to a smaller unit, multiply by the number underlined.

(21) Change 108 inches to ? yards. Divide 108 by 36 to read _____ yards.

(22) Change 7 yards to ? feet. Multiply 7 by 3 to read _____ feet.

(23) A foot is what part of a yard? A yard = 3 feet, so you are comparing 1 to 3. In fraction form then 1 foot = _____ yards.

(24) What part of a foot is 4 inches? _____

(25) What part of a yard is 18 inches? _____

(26) How many feet in $6\frac{1}{3}$ yards? $6\frac{1}{3}$ yards = $\frac{19}{3} \times 3$ feet = $\frac{57}{3}$ = _____ feet.

Make the following changes:

(27) 7 feet to inches. _____

(28) 11 yards to feet. _____

(29) 10 miles to feet. _____

(30) 440 yards to miles. _____

(31) 880 yards to miles. _____

(32) 36 feet to yards. _____

(33) 4 yards 2 feet to feet. _____

(34) 4 yards 2 feet to yards. _____

(35) 17 feet to yards. _____

(36) 66 feet to yards. _____

MEASUREMENT S-7

Name _____ Period _____ Date _____

Objective: You will be able to work with simple scale drawings and maps.

Sometimes we use lines on paper to show distances that are much greater than the actual length of the line on the paper.

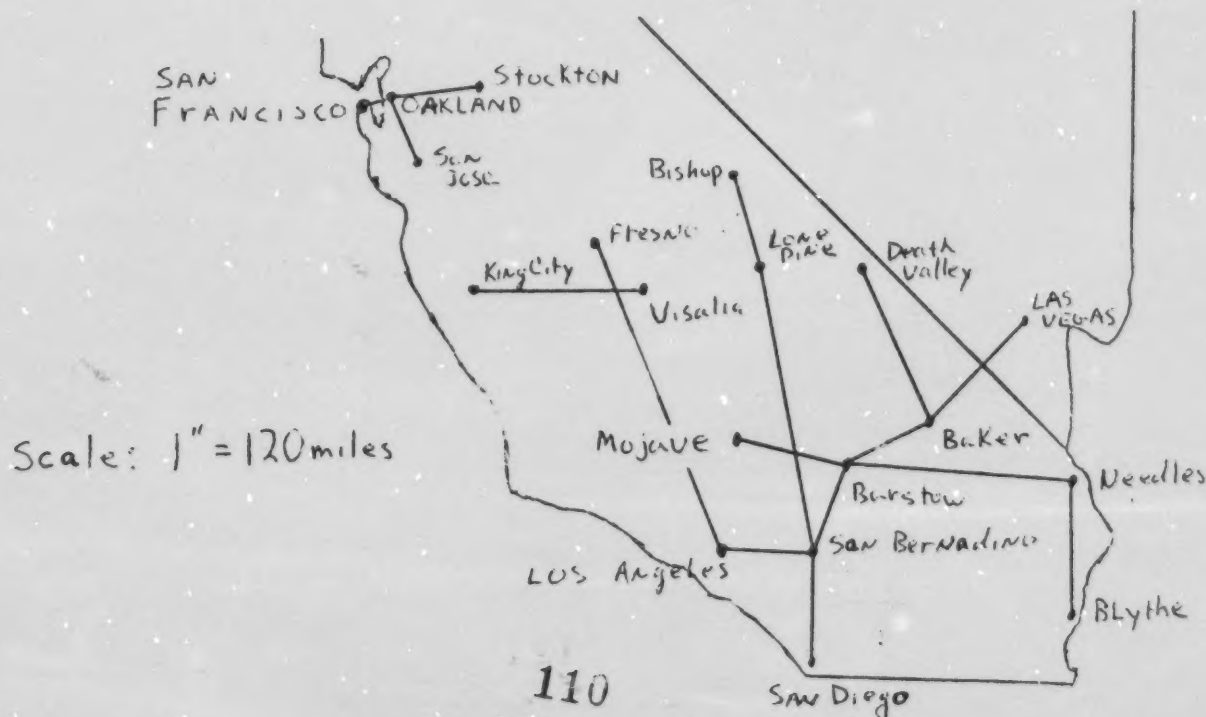
Example: One inch on a map may equal 80 miles. This is called drawing to scale.

Map scale: 1 inch = 80 miles _____

Use the above map scale to solve these problems.

- (1) One inch on the map = _____ miles.
- (2) $\frac{1}{2}$ inch on the map = _____ miles.
- (3) $\frac{1}{4}$ inch on the map = _____ miles.
- (4) By driving all day, you might cover 5 inches on the map. This equals _____ miles.
- (5) You might cover $\frac{1}{2}$ inch per day on the map riding your bike. This would be _____ miles.
- (6) Bill walked 4 miles per hour for 10 hours. On the map scale of 80 miles to the inch, he would have covered _____ inch.

This map has been drawn to a scale of 1" = 120 miles.



- (7) The map has a scale of $1" = 120$ miles. A distance of $2"$ on the map represents _____ miles.

Use $\frac{1}{16}"$ ruler to aid in answering the questions below. Remember the scale: $1" = 120$ miles.

- (8) What is the distance in miles from Los Angeles to Fresno? Use a ruler to measure from dot to dot on the map. You should find it to be about 2 inches.

Multiply $2 \times 120 =$ _____ miles.

Measure the distance on the map and give the scale mileage between the following pairs of cities.

<u>CITIES</u>	<u>RULER MEASURE</u>	<u>MILES</u>
(9) Barstow-Mojave	_____	_____
(10) San Francisco-Stockton	_____	_____
(11) San Jose-Oakland	_____	_____
(12) Baker - Death Valley	_____	_____
(13) Blythe-Needles	_____	_____
(14) Bishop-San Bernadino	_____	_____
(15) King City - Visalia	_____	_____

Use the map on page 1 to answer the next 2 questions.

- (16) Dennis plans a trip from Los Angeles to Las Vegas by the shortest route. What would the mileage be? _____
- (17) Find the distance in miles from San Diego to Bishop _____

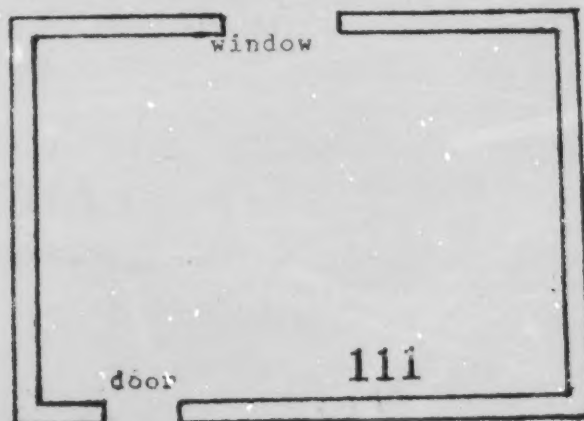
The scale drawing below is of a room with a window opening and door opening. The scale is $1" = 8'$.

- (18) Show the length and width of the room in feet.

Length _____ Width _____

- (19) What is the width of the window in feet? _____

- (20) What is the width of the door in feet? _____



MEASUREMENT S-8 (English System)

Name _____ Period _____ Date _____

Objective: You will be able to use linear measure in the solution of problems.

Table of Linear Measure

1 foot	=	12 inches
1 yard	=	3 feet = 36 inches
1 mile	=	1760 yards = 5280 feet

Linear measure must often be used in computation. Always use the largest units possible in your answer.

(1) Add:

11 ft. 5 in.

2 ft. 9 in.

13 ft. 14 in. = 13 ft + 1 ft + 2 in = _____ ft. and _____ in.

(2) Add:

3 yd 2 ft

8 yd 1 ft

(4) Add:

10 ft 1 in

9 ft 9 in

(3) Add:

7 ft 7 in

9 ft 11 in

(5) Add:

21 ft 8 in

9 ft 6 in

Subtract:

(6) 9 ft 6 in
3 ft 8 in

becomes

8 ft 18 in
3 ft 8 in

(7) 6 yd 1 ft
1 yd 2 ft

(9) 3 miles 800 yards
2 miles 300 yards

(8) 15 yd 2 ft 5 in
5 yd 1 ft 7 in

(10) 1 mile 500 feet
700 feet

Multiply:

(11) 3 ft 6 in
x 3
9 ft 18 in

becomes 9 ft + 1 ft + 6 in = _____

(12) 2 yd 18 in
x 4

(14) 7 yd 1 ft 6 in
x 2

(13) 3 ft 4 in
x 3

112 (15) 1 ft 3 in
x 3

Name _____

Divide:

$$(16) \quad 5 \overline{) 5 \text{ ft } 10 \text{ in}} = \frac{5}{5} \text{ ft} + \frac{10}{5} \text{ in} = \underline{\hspace{1cm}} \text{ ft } \underline{\hspace{1cm}} \text{ in}$$

$$(17) \quad \begin{array}{r} 2 \overline{) 11 \text{ ft } 8 \text{ in}} \\ - 10 \\ \hline 1 \text{ ft } 8 \text{ in} \\ \phantom{1 \text{ ft }} 20 \text{ in} \end{array}$$

Dividing: $11 \div 2 = 5$ remainder 1 ft.

change 1 ft. to 12 inches and add to 8 in. to get 20 inches.

Divide: $20 \div 2 = 10$

$$(18) \quad 5 \overline{) 12 \text{ miles}} = 5 \overline{) 10 \text{ miles} + 10560 \text{ ft.}}$$

$$(19) \quad 4 \overline{) 6 \text{ ft } 4 \text{ in}}$$

$$(20) \quad 4 \overline{) 5 \text{ ft}} = 4 \overline{) 4 \text{ ft} + \underline{\hspace{1cm}} \text{ in}}$$

(21) Robert is 5'7" tall and his sister is 4'9" tall. What is the difference in height? _____.

(22) How many 9" boards can be cut from a single board 1 yard long? _____

(23) If a track man runs the 440 yard run 8 times in one day, how many miles has he covered? _____.

(24) Four pieces each 1 ft. 5 in. long are cut from a board and a piece 4 in. is left. How long was the original board? _____

(25) A girl has a strip of leather five yards long. She cuts the strip into 20" pieces. How many pieces did she cut? _____

LEVEL S CHECKPOINT 5-8

Name _____

Period _____

Measurement

Date _____

1) How many $\frac{1}{16}$ " spaces are in one inch? _____

2) Measure the line below. _____



(S-5)

3) Change 7 feet into inches. _____

4) How many feet are in 4 yards? _____

5) Change 108 inches to feet. _____

(S-6)

6) If 1 inch = 60 miles, $\frac{1}{4}$ inch = _____ miles.

7) If 1 inch = 120 miles, $2\frac{1}{2}$ inches = _____ miles.

(S-7)

8) Add: 3 yd. 2 ft.
+ 4 yd. 2 ft.

9) Subtract: 6 yd. 1 ft.
- 2 yd. 2 ft.

10) Multiply: 2 ft. 6 in.
x 4

(S-8)

LEVEL S A - CHECKPOINT 5-8

Measurement

Name _____

Period _____

Date _____

1) How many $\frac{1}{16}$ " spaces are in $\frac{1}{2}$ inch? _____

2) Measure the line below with $\frac{1}{16}$ " ruler.



(S-5)

3) Change 9 feet to inches. _____

4) How many feet are in 6 yards? _____

5) Change 120 inches to feet. _____

(S-6)

6) If 1 inch = 80 miles, $\frac{1}{4}$ inch = _____ miles.

7) If 1 inch = 130 miles, $2\frac{1}{2}$ inches = _____ miles.

(S-7)

8) Add: 4 yd. 2 ft.

+ 3 yd. 2 ft.

9) Subtract: 6 yd. 2 ft.

- 3 yd. 3 ft.

10) Multiply: 4 ft. 8 in.

x 5

(S-8)

MEASUREMENT (English system) S-9

Name _____ Period _____ Date _____

Objective: You will be able to use the units of liquid measure in solving problems.

Milk, gasoline, medicines and most liquids are sold by liquid units. The basic unit is the liquid ounce. Use the following table to help you do the problems in this lesson.

1 gallon	=	4	quarts
1 quart	=	2	pints
1 pint	=	2	cups
1 cup	=	8	ounces

(Example) Mike has a quart bottle of cola. How many cups can he pour for his friends?

1 quart = 2 pints and 1 pint = 2 cups

1 quart = 2 pints = $2 \times (1 \text{ pint}) = 2 \times (2 \text{ cups})$

so 1 quart = 4 cups

1. Pam drinks one cup of milk for lunch each day. How many days will it take her to drink a gallon of milk? _____
2. Judy has 2 pints of pancake batter but spills $\frac{1}{4}$ of it. How many cups does she have left? _____
3. Punchy Cola comes in 8 ounce bottles and Nasty Cola comes in 12 ounce bottles. How many bottles of Punchy Cola would you have to buy to get the same number of cups as from 4 bottles of Nasty Cola? _____
4. Lewis drinks 9 cartons of milk while Joe drinks 7. Each carton holds 1 cup. How many quarts of milk do they drink together?

5. Milk costs 27 cents a quart and 96 cents a gallon. How much money do you save by buying 5 one-gallon jugs instead of by the quart? _____
6. Beatrice has a motorbike. The fuel tank holds 3 pints. How many times can she fill the bike tank from a 3-gallon can of gas? _____

7. Rachel makes a cake using 1 cup of milk, one ounce of vanilla and 7 ounces of liquid fat. How many cups of liquid did she put in? _____
8. Ruth needs $2\frac{1}{2}$ gallons of punch for a party but can find only one pint cans. How many one-pint cans must she buy to get what she needs? _____
9. How many gallons in one pint? Since there are 8 pints in one gallon, there must be 1 out of 8 or $\frac{1}{8}$ gallons in one pint?

10. Change 2 gallons 2 quarts to quarts. Since 1 gallon contains 4 quarts, 1 gallon has _____ quarts. 2 gallons 2 quarts = _____ quarts + _____ quarts.
Answer: _____
11. Change 3 gallons 1 quart to quarts. _____
12. Change 15 quarts to gallons. Show remainder in quarts.

Name _____ Period _____ Date _____

Objective: You will be able to use units of weight in solving certain problems.

You have often used units of weight. The most common units start with the ounce.

$$1 \text{ pound (lb)} = 16 \text{ ounces (oz)}$$

$$1 \text{ hundredweight (cwt)} = 100 \text{ pounds}$$

$$1 \text{ ton (T)} = 2000 \text{ pounds}$$

- (1) If 16 ounces equal 1 pound, how many ounces in 4 pounds? _____
- (2) Change 48 ounces to pounds. _____ ($48 \div 16 =$ _____)
- (3) Change 8 tons to pounds. _____
- (4) How many tons in 10,000 pounds? _____
- (5) Change 3 lb 5 ounces to ounces. _____
- (6) How many pounds in 80 ounces? _____

When you add or subtract measures, always change your answers to the largest unit possible.
Do these additions or subtractions.

$$(1) \quad \begin{array}{r} 2 \text{ T} \quad 1,400 \text{ lb} \\ + 3 \text{ T} \quad 1,000 \text{ lb} \\ \hline \end{array}$$

$$\quad \quad \quad \begin{array}{r} 5 \text{ T} \quad 2,400 \text{ lb} \\ \hline \end{array}$$

$$= 5 \text{ T} + 2000 \text{ lb} + 400 \text{ lb}$$

$$= 5 \text{ T} + 1 \text{ T} + 400 \text{ lb}$$

$$= \text{_____ Ton} + \text{_____ lb.}$$

$$(2) \quad \begin{array}{r} 4 \text{ T} \quad 1,600 \text{ lb} \\ + 6 \text{ T} \quad 1,200 \text{ lb} \\ \hline \end{array}$$

$$(3) \quad \begin{array}{r} 3 \text{ T} \quad 1800 \text{ lb} \\ + 4 \text{ T} \quad 1600 \text{ lb} \\ \hline \end{array}$$

$$\quad \quad \quad \begin{array}{r} \hline \end{array}$$

$$(4) \quad \begin{array}{r} 23 \text{ T} \quad 1900 \text{ lb} \quad 13 \text{ oz} \\ + 14 \text{ T} \quad 1200 \text{ lb} \quad 15 \text{ oz} \\ \hline \end{array}$$

$$(5) \quad \begin{array}{r} 7 \text{ lb} \quad 13 \text{ oz} \\ 1 \text{ lb} \quad 3 \text{ oz} \\ + 4 \text{ lb} \\ \hline \end{array}$$

$$\quad \quad \quad \begin{array}{r} \hline \end{array}$$

$$\quad \quad \quad \begin{array}{r} \hline \end{array}$$

Name _____

$$\begin{array}{r} (6) \quad 6 \text{ T} \quad 120 \text{ lb} \\ + \quad 8 \text{ T} \quad 960 \text{ lb} \\ \hline \end{array}$$

$$\begin{array}{r} (7) \quad 6 \text{ T} \quad 1800 \text{ lb} \quad 12 \text{ oz} \\ + \quad 8 \text{ T} \quad 200 \text{ lb} \quad 13 \text{ oz} \\ \hline \end{array}$$

$$\begin{array}{r} (8) \quad 18 \text{ T} \quad 900 \text{ lb} \quad 8 \text{ oz} \\ + \quad 12 \text{ T} \quad 300 \text{ lb} \quad 14 \text{ oz} \\ \hline \end{array}$$

$$\begin{array}{r} (9) \quad 5 \text{ T} \quad 300 \text{ lb} \\ 1 \text{ T} \quad 700 \text{ lb} \\ \hline 1000 \text{ lb} \end{array}$$

Add:

$$\begin{array}{r} (10) \quad 7 \text{ lb} \quad 5 \text{ oz} \\ \quad \quad 7 \text{ oz} \\ \hline 4 \text{ lb} \quad 3 \text{ oz} \end{array}$$

Subtract:

$$\begin{array}{r} (11) \quad 10 \text{ lb} \quad 10 \text{ oz} \\ \hline 5 \text{ lb} \quad 6 \text{ oz} \end{array}$$

(12) Subtract:

$$\begin{array}{r} 12 \text{ lb} \quad 10 \text{ oz} \\ \hline 3 \text{ lb} \quad 12 \text{ oz} \end{array} \text{ becomes}$$

$$\begin{array}{r} 11 \text{ lb} \quad 26 \text{ oz} \\ \hline 3 \text{ lb} \quad 12 \text{ oz} \\ 8 \text{ lb} \quad 14 \text{ oz} \end{array}$$

(13) Subtract:

$$\begin{array}{r} 4 \text{ T} \quad 1200 \text{ lb} \\ \hline 3 \text{ T} \quad 1500 \text{ lb} \end{array}$$

(14) Subtract:

$$\begin{array}{r} 12 \text{ T} \quad 500 \text{ lb} \\ \hline 3 \text{ T} \quad 700 \text{ lb} \end{array}$$

(15) Add:

$$\begin{array}{r} 3 \text{ lb} \quad 11 \text{ oz} \\ \hline 1 \text{ lb} \quad 7 \text{ oz} \end{array}$$

(16) Add:

$$\begin{array}{r} 4 \text{ T} \quad 30 \text{ lb} \\ 5 \text{ T} \quad 600 \text{ lb} \\ \hline 4 \text{ T} \quad 1700 \text{ lb} \end{array}$$

(17) Subtract:

$$\begin{array}{r} 5 \text{ T} \\ \hline 3 \text{ T} \quad 200 \text{ lb} \end{array}$$

(18) Subtract:

$$\begin{array}{r} 4 \text{ T} \quad 600 \text{ lb} \\ \hline 900 \text{ lb} \end{array}$$

(19) The greatest weight ever lifted by a human being is 6270 pounds by Paul Anderson (U.S.) in a back lift. This lift was equal to _____ Tons, _____ lbs.

(20) The greatest weight lifted by a woman is 3564 lbs using a hip harness lift. (Mrs. Josephine Blatt, U.S.) This lift was equal to _____ Tons, _____ lbs.

(21) The heart of a very large whale weighed 9460 pounds. The tongue of the same whale weighed 1540 lbs. The total weight of heart and tongue was _____ T, and _____ lbs.

OTHER MEASUREMENTS S-11

Name _____ Period _____ Date _____

Objective: You will be able to use units of time in working certain problems.

What I know, just from living day by day:

- (1) Each birthday I am _____ days older.
- (2) From January 1, 1975 to December 31, 1975 is _____ months.
- (3) From noon one day to noon the next day in Long Beach is _____ Hours.
- (4) An hour after school is _____ minutes.
- (5) The last minute before the lunch bell is _____ seconds.
- (6) Use a calendar or clock if you need to fill in this table.

1 year	=	_____	days
1 year	=	_____	months
1 month	=	_____	weeks
1 month	=	_____	days
1 week	=	_____	days
1 day	=	_____	hours
1 hour	=	_____	minutes
1 minute	=	_____	seconds

- (7) Have your teacher discuss your answers in the table above and initial here before you proceed. _____
- (8) Summer vacation one year began June 18 and ended Sept. 15. (91 days)
How many weeks vacation did you get? _____
- (9) The school year is 180 days. How many months is this? _____
(Use a 30-day month.)
- (10) If you sleep 8 hours a night how many days a year are spent sleeping? _____
(Write answer in days and hours.) _____

Change:

- (11) 7 yrs to months _____
- (12) 2 yrs to days _____
- (13) 49 wks (weeks) to days _____
- (14) 1, 095 days to years _____
- (15) 120 hours to days _____
- (16) 312 hrs (hours) to days _____

Change:

- (17) 12 minutes to seconds _____
(18) 5 minutes 18 sec. (seconds) to seconds _____
(19) 2 hours to seconds _____
(20) 390 minutes to hours _____
(21) 18,000 seconds to hours _____

Answer the following by writing ratios.

REDUCE THE RATIOS TO LOWEST TERMS

- (22) What part of a year is: 6 mo? _____
39 wk? _____
219 da? _____
10 mo? _____
(23) What part of an hour is: 48 min? _____
24 min? _____
1800 sec? _____
7 min 30 sec? _____
(24) What part of a day is: 8 hr? _____
20 hr? _____
4 hr 30 min? _____
1 hr 20 min? _____

ADD: Convert all answers to highest possible unit.

- (25) 1 year 2 mo 3 days (26) 4 years 11 mo
+ 4 yrs 11 mo 33 days + 3 years 8 mo 5 days
(27) 3 days 22 hours 35 min (28) 17 hours 30 min 18 sec
+ 4 days 16 hours 30 min + 14 hours 59 min 55 sec

Let's pretend you are working for the Youth of America Corp. Each day you check in and out on a time clock. The time clock gives you the exact hour and minute from which you have to figure your time. The chart below gives your beginning and ending time each day. Compute the hours and minutes and then figure your time for the days given.

Day	Morning Start	Afternoon end	Total hrs. and min.
1	7:49	3:49	
2	8:01	3:51	
3	7:53	4:02	
4	8:02	5:31	
5	8:06	4:16	
Total Hrs. and Min.			121

Name _____ Period _____ Date _____

Objective: You will be able to use units of money to solve certain problems.

Put in the name of the proper coin.

- (1) One dollar equals 100 _____
 (2) One dollar equals 20 _____
 (3) One dollar equals 10 _____
 (4) One dollar equals 4 _____
 (5) One dollar equals 2 _____

Write the value for each combination of coins shown below.

- (6) One-half dollar and one dime. _____ (6)
 (7) Three nickels. _____ (7)
 (8) Three quarters. _____ (8)
 (9) Three dimes and 7 pennies. _____ (9)
 (10) One quarter, one nickel, one penny. _____ (10)
 (11) One-half dollar, 2 quarters, 2 dimes. _____ (11)
 (12) Two half-dollars, one dime, 17 pennies. _____ (12)
 (13) Write 879 cents using \$ sign. _____ (13)
 (14) Write 53 cents using the \$ sign. _____ (14)

List four different ways to use these coins to get 25¢.

- | Quarter | + | Dime | + | Nickel | = | |
|------------|---|-------|---|--------|---|--------|
| (15) _____ | + | _____ | + | _____ | = | \$.25 |
| (16) _____ | + | _____ | + | _____ | = | \$.25 |
| (17) _____ | + | _____ | + | _____ | = | \$.25 |
| (18) _____ | + | _____ | + | _____ | = | \$.25 |

What coins represent:

- (19) $\frac{10}{100}$ of a dollar _____ (20) $\frac{1}{4}$ of a dollar _____ (21) $\frac{25}{100}$ of a dollar _____
 (22) $\frac{1}{100}$ of a dollar _____ (23) $\frac{5}{100}$ of a dollar _____ (24) $\frac{1}{20}$ of a dollar _____

Write these amounts of money using the dollar sign (\$) and decimal point (.).

- (25) 879 cents = \$8.79 _____ (26) 29 cents = _____
 (27) 304 cents = _____ (28) 6 cents = _____
 (29) 1430 cents = _____

Name _____

S-12 page 2

Write the total value of these coins using the dollar sign and decimal point.

- (30) A half-dollar and a dime _____
- (31) A half-dollar, two quarters and two dimes. _____
- (32) Three quarters _____
- (33) One quarter, one dime, two nickels, one penny _____

Give answers for the following:

- (34) Roy bought a pen costing 39¢. He paid with a dollar bill. What was his change? _____
- (35) Jim bought a taco, costing 38¢. The clerk said, "38 cents. Here is 39, 40, 50¢." What coins did Jim get back? _____
- (36) Ramon spent 37¢ for candy, 43¢ for a hamburger, 15¢ for a coke, and 7¢ for gum. He paid with two one-dollar bills. What was his change? _____
- (37) If 6 coins are used to make up 85¢ what are the coins? _____

Look at the amount of money shown at the top of each chart. List 5 or more different sets of coins which equal each amount.

36 cents

	Dimes	Nickels	Pennies
(38)	3	1	1
(39)	3		6
(40)			
(41)			
(42)			

96 cents

	Quarters	Dimes	Nickels	Pennies
(43)	2	4	1	1
(44)				
(45)			123	
(46)				

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LEVEL S CHECKPOINT 9-12

Name _____

Period _____

Measurement

Date _____

1) There are _____ cups in a pint.

2) There are _____ liquid ounces in a cup.

3) There are _____ quarts in a gallon.

(S-9)

4) There are _____ lbs in a ton.

5) 1 ton 1254 lbs 8 ozs

+ 7 tons 846 lbs 11 ozs

6) 2 tons 1 oz

- 1 tons 700 lbs 7 ozs

(S-10)

7) How many minutes in $2\frac{1}{2}$ hours? _____

8) How many days does 312 hours make? _____

(S-11)

9) One dollar equals _____ nickels.

10) List four different ways to use these coins to get 70¢

	quarter	dime	nickels
a)	_____	_____	_____
b)	_____	_____	_____
c)	_____	_____	_____
d)	_____	_____	_____

(S-12)

Name _____

Period _____

Measurement

Date _____

1) There are _____ liquid ounces in a cup.

2) There are _____ cups in a quart.

3) There are _____ quarts in a half gallon.

(S-9)

4) There are _____ ounces in a pound.

5) 3 tons 1800 lbs 10 ozs
 + 4 tons 900 lbs 9 ozs

6) 18 tons 900 lbs 8 ozs
 - 12 tons 300 lbs 14 ozs

(S-10)

7) How many seconds in an hour? _____

8) What part of an hour is 24 minutes? _____

(S-11)

9) List four different ways to use these coins to get 55¢.

	quarter	dime	nickel
a)	_____	_____	_____
b)	_____	_____	_____
c)	_____	_____	_____
d)	_____	_____	_____

10) What is the least amount of coins you would need to get 37¢? _____ List them

(S-12)

POSTTEST LEVEL 3

Name _____

Period _____

Measurement

Date _____

1) What "standard unit" would you use to measure the width of your desk? _____

2) How many one-foot rulers "make up" a yard stick? _____

(S-1)

3) Which unit of length would you use to measure the length of a pencil? _____

4) How many $\frac{1}{2}$ inches in 3 inches? _____

5) How many $\frac{1}{2}$ - inch spaces between the 1" and 4" marks on a ruler? _____

(S-2)

6) How many $\frac{1}{4}$ " spaces between the 2" and 4" marks on a ruler? _____

7) Measure this line segment to the nearest $\frac{1}{4}$ ".

A _____ B

$\overline{AB}$ = _____ inches

(S-3)

8) How many $\frac{1}{8}$ " spaces in $\frac{1}{4}$ "? _____

9) How many $\frac{1}{8}$ " spaces in 1"? _____

(S-4)

10) How many $\frac{1}{16}$ " spaces in 1"? _____

11) Use a $\frac{1}{16}$ " ruler to measure this segment.

C _____ D

$\overline{CD}$ = _____ inches

(S-5)

12) 3 feet is the same as _____ inches.

13) Change 96 inches to feet. _____

14) 2 miles = _____ yards.

(S-6)

15) The scale on a map reads 1" = 100 miles.

$3\frac{1}{2}$ inches on the map represents _____ miles.

(S-7)

(16) Add:

7 feet 7 inches
3 feet 11 inches

(17) Subtract:

7 feet 7 inches
3 feet 11 inches

(S-8)

Posttest Level S (con't)

18) Multiply:

$$\begin{array}{r} 1 \text{ yd.} \quad 2 \text{ ft.} \quad 5 \text{ in.} \\ \times 3 \\ \hline \end{array}$$

19) Divide:

$$5 \overline{) 3 \text{ yd.} \quad 2 \text{ ft.} \quad 8 \text{ in.}}$$

(S-8)

20) $2\frac{1}{2}$ gallons = _____ quarts.

21) 3 quarts = _____ liquid ounces.

22) 4 cups = 1 _____.

(S-9)

23) Change 48 ounces to pounds. _____

24) $4\frac{1}{2}$ tons = _____ pounds.

25) Add:

$$\begin{array}{r} 3 \text{ tons} \quad 1200 \text{ lb.} \quad 4 \text{ oz.} \\ 4 \text{ tons} \quad 800 \text{ lb.} \quad 15 \text{ oz.} \\ \hline \end{array}$$

26) Subtract:

$$\begin{array}{r} 2 \text{ tons} \quad 100 \text{ lb.} \quad 4 \text{ oz.} \\ 1 \text{ ton} \quad 200 \text{ lb.} \quad 10 \text{ oz.} \\ \hline \end{array}$$

(S-10)

27) What part of a day is 8 hours? _____

28) Change 11 minutes to seconds. _____

(S-11)

29) 8 dimes = 16 _____

30) What change would you receive if you spent \$1.14 and gave the clerk a 5 dollar bill?

_____ five dollar bill, _____ one dollar bill,
 _____ half dollar, _____ quarters, _____ dimes,
 _____ nickels, _____ pennies

(S-12)

MEASUREMENT (Metric System) T-1

Name _____ Period _____ Date _____

Objective: You will be able to see the weaknesses of the English System of measurement.

The system of measurement we commonly use is called the English System. It is not a very easy system to work with because there are so many different number relations to remember.

Also, the names of the units like "inch" and "foot" offer no clue as to how many of either measure is contained in a yard, the basic unit of the English System for length. There is another system of measures in which names of the units do just this, as you will see later.

Use the following numbers to fill in the blanks.

2, 3, 4, 8, 12, 16, 36, 1760, 2000, 5280, 63360

Length

1) 1 foot = _____ inches

2) 1 yard = _____ inches

3) 1 mile = _____ inches

4) 1 yard = _____ feet

5) 1 mile = _____ feet

6) 1 mile = _____ yards

Liquid Measure

7) 1 pint = _____ cups

8) 1 cup = _____ fluid ounces

9) 1 quart = _____ pints

10) 1 quart = _____ cups

11) 1 gallon = _____ quarts

Dry Measure

12) 1 quart = _____ pints

13) 1 peck = _____ quarts

14) 1 bushel = _____ pecks

Weight

15) 1 pound = _____ ounces

16) 1 ton = _____ pounds

Did you remember all of these number relations? I bet you didn't because I don't even know them all. These are just the common ones used! There are still other units such as for length: link, chain, furlongs, rods; liquid measures: gills, noggins, hogshead, pottle.

1 chain = 100 links	4 gills = 1 pint
10 chains = 1 furlong	4 noggins = 1 pint
8 furlongs = 1 mile	1 hogshead = 63 gallon
40 rods = 1 mile	2 pottles = 1 gallon

More than 150 years ago, in 1789, French scientists decided that a more efficient system was needed. In this system, each unit of measure is equal to the product of some power of ten and the chosen basic unit, and the names of these units of measure show these powers of ten. The inventors of the system named their basic unit of length the meter; hence this system became known as the Metric System.

Metric measurement is easier to learn. It's easier to multiply by 10 than to remember how many feet are in a yard or in a mile.

Almost all of the countries in the world are using the metric measurements. The United States will someday be using this system also. We now use the metric measurement in science. When we compete with other countries in track, we run the 200 meter run, 1,500 meter and others.

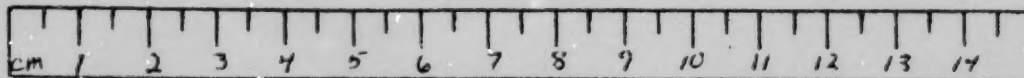
Here are a few more problems in the English System:

- 17) 4 feet = _____ inches
- 18) 3 inches = _____ yards
- 19) 25 feet = _____ miles
- 20) 46 yards = _____ inches
- 21) 4 gallons = _____ cups
- 22) 1 quart = _____ fluid ounces
- 23) 1 mile = 1000 yards and _____ ft.
- 24) 2 feet = _____ yards
- 25) 200 pounds = _____ tons

MEASUREMENT (Metric System) T - 2

Name _____ Period _____ Date _____

Objective: You will be able to find metric measures of length and change from one unit to another.



Look at the ruler above.

The division shown above from 0 to 1, is called a centimeter. The symbol for centimeter is cm.

Measure the following line segments. (Get a metric ruler from the teacher)

- | | | |
|-----|-------|------------|
| (1) | _____ | _____ 3 cm |
| (2) | _____ | _____ cm |
| (3) | _____ | _____ cm |
| (4) | _____ | _____ cm |
| (5) | _____ | _____ cm |

On the metric ruler, do you see a mark that looks halfway between 0 and 1. That is the mark for half of a centimeter.

_____ This line segment is 6.5 cm long.
We will use decimals instead of fractions in the metric system.)

Measure these line segments.

- | | | |
|------|-------|-------------|
| (6) | _____ | _____ .5 cm |
| (7) | _____ | _____ cm |
| (8) | _____ | _____ cm |
| (9) | _____ | _____ cm |
| (10) | _____ | _____ cm |

The smallest marks on the ruler stand for (1/10) .1 of a centimeter.

_____ This line segment is 3.7 cm.

Measure the following line segments to the nearest tenth of a centimeter.

- | | | |
|-----|-------|-------------|
| 11) | _____ | _____ .6 cm |
| 12) | _____ | _____ cm |
| 13) | _____ | _____ cm |
| 14) | _____ | _____ cm |
| 15) | _____ | _____ cm |

The centimeter is divided into 10 parts. Each part is called a millimeter. The symbol for millimeter is mm.

- 16) There are _____ millimeters in a centimeter.

Name _____

Measure the following line segments in millimeters and centimeters.
(Use the side of your ruler marked mm in measuring millimeters,
if you wish.)

- (17) _____ 4 cm 40 mm
 (18) _____ _____ cm _____ mm
 (19) _____ _____ cm _____ mm
 (20) _____ _____ cm _____ mm
 (21) Look at your answers above. Do you see how to change from
centimeters to millimeters? _____
 (22) Complete this statement. To change centimeters to millimeters,

Now change these without using your ruler.

- (23) 12 cm = _____ mm (26) 10 cm = _____ mm
 (24) 9 cm = _____ mm (27) 3.6 cm = _____ mm
 (25) 21 cm = _____ mm (28) 2.4 cm = _____ mm
 (29) Did you multiply the number of centimeters by ten to find the
number of millimeters? _____
 (30) What do you think you would do to change millimeters to centimeters?

Measure the following line segments in millimeters and centimeters.

- (31) _____ 30 mm _____ cm
 (32) _____ _____ mm _____ cm
 (33) _____ _____ mm _____ cm
 (34) _____ _____ mm _____ cm
 (35) How could you have found the length in centimeters without
measuring, after you know the length in millimeters? Would you
divide by 10 or multiply by 10? _____

Change these without the use of your ruler.

- (36) 20 mm = _____ cm (39) 110 mm = _____ cm
 (37) 38 mm = _____ cm (40) 75 mm = _____ cm
 (38) 4 mm = _____ cm

As you have seen from this lesson 1 centimeter = 10 millimeters.

- (41) To change from centimeters to millimeters, you _____ by 10.
 (42) To change from millimeters to centimeters, you _____ by 10.

Isn't this easier than changing inches to feet and feet to inches,
multiplying and dividing by 12.

MEASUREMENT (Metric System) T - 3

Name _____ Period _____ Date _____

Objectives: You will be able to:

- 1) multiply and divide by 10, 100, 1000 . . .
- 2) know the metric units of length
- 3) change a metric unit of length to another metric unit of length

Review

It is easy to multiply and divide by 10, 100, 1000, etc, because all you do is move the decimal point. To multiply, you move the decimal point to the right (to make the number larger).

Remember - $57 = 57.$

Example A) $57 \times 100 = 5700$

57.00 ← add zeros if needed

Move the decimal point two places to the right because there are two zeros in 100.

Example B) $4.2 \times 1000 = 4200$

4.200 ← add zeros if needed

Move the decimal point three places to the right because there are three zeros in 1000.

Try these problems.

(1) $24 \times 100 =$ _____

(6) $7.5 \times 1000 =$ _____

(2) $1.05 \times 10 =$ _____

(7) $64 \times 1000 =$ _____

(3) $100 \times 10 =$ _____

(8) $3.7 \times 10 =$ _____

(4) $.073 \times 1000 =$ _____

(9) $43. \times 100 =$ _____

(5) $.05 \times 1,000,000 =$ _____

(10) $.0047 \times 1000 =$ _____

To divide by 10, 100, 1000, etc, you move the decimal point to the left (to make the number smaller).

Example A) $2.3 \div 1000 = .0023$

$.0023$ ← add zeros if needed

Move the decimal point three places to the left because there are three zeros in 1000.

Example B) $37 \div 100,000 = .00037$

$.00037$ ← add zeros if needed

Move the decimal point five places to the left because there are five zeros in 100,000.

Now try these.

(11) $5.7 \div 1000 =$ _____

(16) $100000 \div 100 =$ _____

(12) $43 \div 10 =$ _____

(17) $63 \div 100 =$ _____

(13) $.073 \div 100 =$ _____

(18) $80 \div 10 =$ _____

(14) $23 \div 10000 =$ _____

(19) $.09 \div 100 =$ _____

(15) $300 \div 10 =$ _____

(20) $400 \div 1,000,000 =$ _____

In the previous lesson you learned that 1 centimeter = 10 millimeters. So, 1 millimeter = .1 centimeters. But what is a centimeter and millimeter? The basic unit of length in the Metric System is the meter. Do you see this word in centimeter and millimeter? Centi means hundredth and milli means thousandths. So, centimeter is $\frac{1}{100}$ or .01 of a meter, and millimeter is $\frac{1}{1000}$ or .001 of a meter.

Study the following table:

<u>Unit</u>	<u>Unit Equivalent in Meters</u>
Meter	1 meter
Decimeter	$\frac{1}{10}$ or .1 meter
Centimeter	$\frac{1}{100}$ or .01 meter
Millimeter	$\frac{1}{1000}$ or .001 meter

- 21) What part of a meter is a decimeter? _____
- 22) What is the meaning of the prefix deci? _____
- 23) Since a decimeter is $\frac{1}{10}$ or .1 of a meter, how many decimeter do you need to have one meter? 1, 10, 100, 1000
(Circle correct answer)
- 24) What part of a meter is a centimeter? _____
- 25) What is the meaning of the prefix centi? _____
- 26) Since a centimeter is $\frac{1}{100}$ or .01 of a meter, how many centimeters do you need to make a meter? 1, 10, 100, 1000
(Circle correct answer)
- 27) What part of a meter is a millimeter? _____
- 28) What is the meaning of the prefix milli? _____
- 29) Since a millimeter is $\frac{1}{1000}$ or .001 of a meter, how many millimeter do you need to make a meter? 1, 10, 100, 1000
(Circle correct answer)
- 30) Fill in the blanks. Use your answers from problems 23, 26, 29.

1 meter = _____	decimeters
1 meter = _____	centimeters
1 meter = _____	millimeter

- 31) Since there are 10 decimeters in a meter and 100 centimeters in a meter, how many centimeters are in a decimeter?
1, 10, 100, 1000 (Circle correct answer)
- 32) Since there are 10 decimeters in a meter and 1000 millimeters in a meter, how many millimeters are in a decimeter?
1, 10, 100, 1000 (Circle correct answer)
- 33) Since there are 100 centimeters in a meter and 1000 millimeters in a meter, how many millimeters are in a centimeter?
1, 10, 100, 1000 (Circle correct answer)
- 34) 1 meter = _____ decimeters, = _____ centimeters
= _____ millimeters

MEASUREMENT (Metric System) T-4

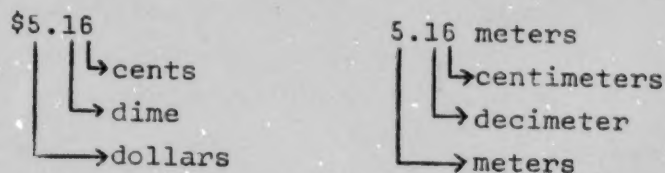
Name _____ Period _____ Date _____

Objective: You will be able to convert any metric unit of length to another metric unit of length

Every system of measurement must have a basic standard unit. The meter is the basic standard unit of length in the metric system. It is slightly longer than the yard, measuring a little more than 39 inches.

The Metric system, like our numeration system is based on powers of ten. Therefore, a decimal system.

The diagram below will help you remember the decimal pattern that is used in both dollars and meters



It is easy to convert one metric unit of length to another metric unit of length, because it is necessary only to multiply by 10, 100, 1000 etc... or divide by 10, 100, 1000 etc....

Use the following chart to convert from one unit to another

millimeter	mm		
centimeter	cm	going down	going up
decimeter	dm	divide	multiply
meter	m		
decameter	dkm		
hectometer	hkm		
kilometer	km		

Convert a) 17 m to _____ dm

since you go up the chart you multiply. Up 1 means to multiply by 10 because there is one zero in 10.

So, 17 m = 17 x 10 dm

17 m = 170 dm

T-4

b) $1.5 \text{ km} = \underline{\hspace{2cm}} \text{ m}$

Since you are going up three, you multiply by 1000 because there are three zeros in 1000. So $1.5 \text{ km} = 1.5 \times 1000 \text{ m}$

$1.5 \text{ km} = \underline{1500} \text{ m}$

Now try these:

1) $3 \text{ cm} = \underline{\hspace{2cm}} \text{ mm}$

2) $7 \text{ m} = \underline{\hspace{2cm}} \text{ mm}$

3) $8 \text{ dkm} = \underline{\hspace{2cm}} \text{ dm}$

4) $1 \text{ km} = \underline{\hspace{2cm}} \text{ m}$

5) $4 \text{ dm} = \underline{\hspace{2cm}} \text{ cm}$

6) $16 \text{ hm} = \underline{\hspace{2cm}} \text{ dm}$

7) $4.2 \text{ km} = \underline{\hspace{2cm}} \text{ m}$

8) $3.6 \text{ m} = \underline{\hspace{2cm}} \text{ cm}$

Convert

c) $14 \text{ cm} = \underline{\hspace{2cm}} \text{ m}$

Since you go down the chart, you divide. Down 2 means to divide by 100 because there are two zeros in 100.

So, $14 \text{ cm} = 14 \div 100 \text{ m}$ (move decimal two places to the left)

d) $7.1 \text{ m} = \underline{\hspace{2cm}} \text{ km}$

Since you are going down three, you divide by 1000 because there are three zeros in 1000.

So, $7.1 \text{ m} = 7.1 \div 1000 \text{ km}$

$7.1 \text{ m} = \underline{.0071} \text{ km}$

Now try these:

9) $5 \text{ m} = \underline{\hspace{2cm}} \text{ hm}$

10) $6 \text{ dm} = \underline{\hspace{2cm}} \text{ m}$

11) $14 \text{ m} = \underline{\hspace{2cm}} \text{ km}$

12) $10 \text{ dkm} = \underline{\hspace{2cm}} \text{ hm}$

13) $8 \text{ mm} = \underline{\hspace{2cm}} \text{ dm}$

14) $60 \text{ cm} = \underline{\hspace{2cm}} \text{ m}$

15) $4 \text{ dkm} = \underline{\hspace{2cm}} \text{ km}$

16) $1.7 \text{ m} = \underline{\hspace{2cm}} \text{ dkm}$

17) $.4 \text{ mm} = \underline{\hspace{2cm}} \text{ cm}$

18) $300 \text{ cm} = \underline{\hspace{2cm}} \text{ km}$

Here some that are mixed up up and down

19) $3.5 \text{ m} = \underline{\hspace{2cm}} \text{ cm}$

20) $4.9 \text{ cm} = \underline{\hspace{2cm}} \text{ mm}$

21) $3.6 \text{ m} = \underline{\hspace{2cm}} \text{ km}$

22) $.03 \text{ m} = \underline{\hspace{2cm}} \text{ dm}$

23) $.09 \text{ mm} = \underline{\hspace{2cm}} \text{ km}$

24) $500 \text{ m} = \underline{\hspace{2cm}} \text{ mm}$

LEVEL T A-CHECKPOINT 1-4

Name _____

Period _____

Metric System

Date _____

True or False

1) Most countries use the metric system? _____

2) A noggin is a unit of the metric system? _____

(T-1)

Measure the following line segments

3) _____ cm or _____ mm

4) _____ cm or _____ mm

5) 10 mm = _____ cm

(T-2)

6) a) $23 \times 1000 =$ _____

b) $4700 \div 100 =$ _____

7) 1 Meter = _____ decimeters = _____ centimeter = _____ millimeter

(T-3)

8) a) _____	mm	.001 meter
b) centimeter	_____	.01 meter
c) decimeter	dm	_____ meter
d) meter	m	1 meter
e) _____	dkm	10 meters
f) hectometer	hm	_____ meters
g) kilometer	_____	1000 meters

9) a) 4 cm = _____ mm

b) 1.7 m = _____ cm

c) 16 km = _____ m

d) .23 km = _____ cm

10) a) 1 m = _____ km

b) 1.8 mm = _____ cm

c) 402 cm = _____ m

d) 240 cm = _____ km

(T-4)

LEVEL T CHECKPOINT 1-4

Name _____

Period _____

Metric System

Date _____

True or False

1) Most countries do not use the metric system. _____

2) A pottle is a unit of the English System? _____

(T-1)

Measure the following line segments

3) _____ cm or _____ mm

4) _____ cm or _____ mm

5) 1cm = _____ mm

(T-2)

6) a) $7.5 \times 1000 =$ _____

b) $.09 \div 100 =$ _____

How many cents in a dollar? _____

How many centimeters in a meter? _____

(T-3)

8) Complete the chart

a) millimeter	mm	.001 meter
b) _____	cm	_____ meter
c) <u>decimeter</u>	_____	<u>.1</u> meter
d) meter	m	1 meter
e) d ecameter	dkm	_____ meters
f) hectometer	_____	<u>100</u> meters
g) _____	km	1000 meters

9) Basic unit of length in the metric system is the _____.

10) a) 3cm = _____ mm

b) 7m = _____ km

c) 6m = _____ cm

d) 1.6km = _____ m

(T-4)

Name _____ Period _____ Date _____

Objective: You will be able to use metric units of length in the solution of problems.

In your science classes you will probably be using the units millimeters, centimeters, meters, more often than inches, feet, and yards. Because of the decimal nature of the metric system, computation with metric units is more easily done than computation with English units.

Addition: Recall how English units of length are added.

$$\begin{array}{r} 4 \text{ yds. } 2 \text{ ft. } 6 \text{ in.} \\ + 2 \text{ yds. } 2 \text{ ft. } 8 \text{ in.} \\ \hline \end{array}$$

$$6 \text{ yds. } 4 \text{ ft. } 14 \text{ in.}$$

$$14 \text{ inches} = 1 \text{ ft. } 2 \text{ in.}$$

$$4 \text{ feet} = 1 \text{ yd. } 1 \text{ ft.}$$

$$\text{So, } 6 \text{ yds.} + 1 \text{ yd.} + 1 \text{ ft.} + 1 \text{ ft.} + 2 \text{ in.} = \underline{6 \text{ yds. } 2 \text{ ft. } 2 \text{ in.}}$$

We can follow the same method to add metric units.

$$\begin{array}{r} 5 \text{ cm } 6 \text{ mm} \\ + 3 \text{ cm } 6 \text{ mm} \\ \hline 8 \text{ cm } 12 \text{ mm} \end{array}$$

$$\begin{array}{r} 12 \text{ mm} = 1 \text{ cm } 2 \text{ mm} \\ \text{So, } 8 \text{ cm} + 1 \text{ cm} + 2 \text{ mm} = \underline{9 \text{ cm } 2 \text{ mm}} \end{array}$$

Add these:

$$\begin{array}{r} (1) \quad 2 \text{ cm } 7 \text{ mm} \\ + 4 \text{ cm } 4 \text{ mm} \\ \hline \end{array}$$

$$\begin{array}{r} (2) \quad 1 \text{ dm } 3 \text{ cm } 4 \text{ mm} \\ + 2 \text{ dm } 6 \text{ cm } 8 \text{ mm} \\ \hline \end{array}$$

$$\begin{array}{r} (3) \quad 7 \text{ cm } 4 \text{ mm} \\ + 6 \text{ cm } 5 \text{ mm} \\ \hline \end{array}$$

_____ dm _____ cm _____ mm

$$\begin{array}{r} (4) \quad 3 \text{ cm } 5 \text{ mm} \\ + 5 \text{ cm } 7 \text{ mm} \\ \hline \end{array}$$

Scientists take advantage of the decimal nature of the metric system by renaming 3cm 5mm as 3.5cm and 5cm 7mm as 5.7cm. If you express all measurements in a problem in the same unit, you can add just like decimal fractions.

$$\begin{array}{r} \text{Example:} \quad 3 \text{ cm } 5 \text{ mm} = 3.5 \text{ cm} \\ + 5 \text{ cm } 7 \text{ mm} = 5.7 \text{ cm} \\ \hline 9.2 \text{ cm} \end{array}$$

Try these.

$$\begin{array}{r} (5) \quad 1 \text{ m } 4 \text{ dm} = 1.4 \text{ m} \\ + 2 \text{ m } 7 \text{ dm} = \underline{\quad \text{m}} \\ \hline \end{array}$$

$$\begin{array}{r} (6) \quad 4 \text{ cm } 3 \text{ mm} = \underline{\quad \text{cm}} \\ + 3 \text{ cm } 8 \text{ mm} = \underline{\quad \text{cm}} \\ \hline \end{array}$$

$$\begin{array}{r} (7) \quad 9 \text{ cm } 8 \text{ mm} = \underline{\quad \text{cm}} \\ + 3 \text{ cm } 5 \text{ mm} = \underline{\quad \text{cm}} \\ \hline \end{array}$$

_____ dm _____ cm

$$\begin{array}{r} (8) \quad 2 \text{ m } 4 \text{ dm } 6 \text{ cm } 5 \text{ mm} = \underline{\quad \text{m}} \\ + 1 \text{ m } 8 \text{ dm } 0 \text{ cm } 2 \text{ mm} = \underline{\quad \text{m}} \\ \hline \end{array}$$

_____ m

Name _____

Subtraction: Change units to same units, then subtract.

$$\begin{array}{r} 9\text{cm} \quad 4\text{mm} = 9.4\text{cm} \\ - 6\text{cm} \quad 5\text{mm} = 6.5\text{cm} \\ \hline 2.9\text{cm} \end{array}$$

Try these.

$$\begin{array}{r} (9) \quad 3\text{m} \quad 4\text{dm} \quad 8\text{cm} = \underline{\hspace{2cm}} \text{m} \\ - 2\text{m} \quad 0\text{dm} \quad 6\text{cm} = \underline{\hspace{2cm}} \text{m} \\ \hline \underline{\hspace{2cm}} \text{m} \end{array}$$

$$\begin{array}{r} (10) \quad 1\text{km} = 1000\text{m} \quad \text{or} \quad 1\text{km} \\ - 3\text{m} = \underline{\hspace{2cm}} \text{m} \quad \text{or} \quad .003\text{km} \\ \hline = 997\text{m} \quad \text{or} \quad \underline{\hspace{2cm}} \text{km} \end{array}$$

$$\begin{array}{r} (11) \quad 3\text{m} \quad 4\text{cm} = \underline{\hspace{2cm}} \text{m} \\ - 1\text{m} \quad \quad 8\text{mm} = \underline{\hspace{2cm}} \text{m} \\ \hline \underline{\hspace{2cm}} \text{m} \end{array}$$

$$\begin{array}{r} (12) \quad 5\text{dm} \quad 1\text{cm} \quad 3\text{mm} = \underline{\hspace{2cm}} \text{dm} \\ - 1\text{dm} \quad 8\text{cm} \quad 7\text{mm} = \underline{\hspace{2cm}} \text{dm} \\ \hline \underline{\hspace{2cm}} \text{dm} \end{array}$$

Multiply: Rename units to one unit.

$$\begin{array}{r} 2\text{m} \quad 4\text{dm} = 2.4\text{m} \\ \times 3 \quad \quad \times 3 \\ \hline 7.2\text{m} = 7\text{m} \quad 2\text{dm} \end{array}$$

Try these.

$$\begin{array}{r} (13) \quad 1\text{m} \quad 3\text{dm} \quad 4\text{cm} \quad 5\text{m} = \underline{\hspace{2cm}} \text{m} \\ \quad \quad \quad \times 6 \quad \quad \times 6 \\ \hline \underline{\hspace{2cm}} \text{m} \end{array}$$

$$\begin{array}{r} (14) \quad 3\text{m} \quad 5\text{dm} = \underline{\hspace{2cm}} \text{m} \\ \quad \quad \quad \times 6 \quad \quad \times 6 \\ \hline \underline{\hspace{2cm}} \text{m} \end{array}$$

$$\begin{array}{r} (15) \quad 2\text{km} \quad 7\text{dm} \quad 6\text{dm} \quad 4\text{m} = \underline{\hspace{2cm}} \text{km} \\ \quad \quad \quad \times 9 \quad \quad \times 9 \\ \hline \underline{\hspace{2cm}} \text{km} \end{array}$$

Division: Do you recall that division using English units are quite complicated? Consider the following:

Divide- 3yds. 2ft 4in. by 2

$$\begin{array}{r} 1\text{yd.} \quad 2\text{ft.} \quad 8\text{in.} \\ 2 \overline{) 3\text{yds.} \quad 2\text{ft.} \quad 4\text{in.}} \\ \underline{2\text{yds.}} \\ 1\text{yd.} \quad 2\text{ft.} = 5\text{ft.} \\ \underline{1\text{ft.}} \\ 1\text{ft.} \quad 4\text{in.} = 16\text{in.} \end{array}$$

In the metric system, do divide 3m 4dm 5cm 2mm by 2, we simply rename 3m 4dm 5cm 2mm as 3.452m.

$$\begin{array}{r} 1.726\text{m} \\ 2 \overline{) 3.452\text{m}} \end{array}$$

Try these.

$$(16) \quad 3 \overline{) 4\text{cm} \quad 5\text{mm}} = \underline{\hspace{2cm}} \text{cm}$$

$$3 \overline{) \underline{\hspace{2cm}}} \text{cm}$$

$$(17) \quad 2 \overline{) 3\text{m} \quad 4\text{dm} \quad 2\text{cm}}$$

$$(19) \quad 6 \overline{) 3\text{cm} \quad 6\text{mm}}$$

$$(18) \quad 4 \overline{) 5\text{m} \quad 7\text{dm} \quad 2\text{cm} \quad 4\text{mm}}$$

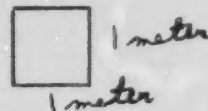
$$(20) \quad 5 \overline{) 4\text{dm} \quad 2\text{cm} \quad 5\text{mm}}$$

MEASUREMENT (Metric System) T-6

Name _____ Period _____ Date _____

Objective: You will be able to use metric units of area and volume in solving problems.

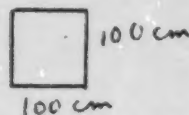
In the metric system the basic unit for measuring areas is a square region with side of length one meter, that is a square meter. (sq. m)



Let's see how many square centimeters there are in a square meter.

Since 1 m = 100 cm

$$1 \text{ sq. m} = 100\text{cm} \times 100\text{cm} = 10,000 \text{ sq.cm}$$



Refer to the chart in lesson T-4 for metric units

Square measurement is easy, just use the chart but double your count

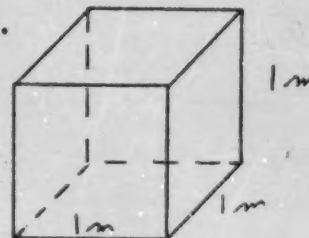
example: 1 sq. m = _____ sq. mm meter to millimeter is up
3, doubled 6 so multiply by 1,000,000 because it has
 6 zeros. So 1 sq. m = 1 x 1,000,000 sq. mm
 1 sq. m = 1,000,000 sq. mm

Try these now.

- 1) 1 sq. cm = _____ sq. mm 2) 1 sq. cm = _____ sq. m
- 3) 1 sq. mm = _____ sq. m 4) 1 sq. km = _____ sq. m
- 5) 4 sq. cm = _____ sq. mm 6) 5 sq. m = _____ sq. cm
- 7) 7.2 sq. dm = _____ sq. mm 8) 8 sq. m = _____ sq. mm
- 9) 6 sq. km = _____ sq. cm 10) 1.3 sq. hm = _____ sq. dkm

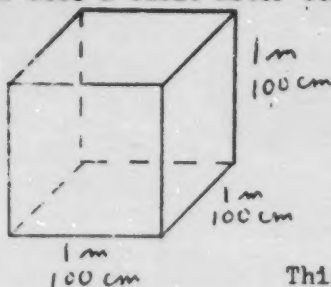
page 2

Just as the standard unit of area measure in the metric system is a square with each side of length 1 meter, the standard unit of volume measure in the metric system is a cubical solid with each edge of length 1 meter. Its volume is 1 cubic meter.



Since a meter is more than 3 feet, you can see that for many purposes the cubic meter is a rather large unit of volume measure. A unit that you will use in science is the cubic centimeter (cc). When you get a shot at the doctor's office or clinic the shot is measured in cc's.

How does a cubic meter compare with a cubic centimeter?



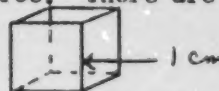
$$1 \text{ cu m} = \underline{\hspace{2cm}} \text{ cc}$$

$$1 \text{ m} = 100 \text{ cm}$$

$$1 \text{ cu m} = 100 \text{ cm} \times 100 \text{ cm} \times 100 \text{ cm} = 1,000,000 \text{ cc}$$

Count the zeros. There are 6 zeros so

This is one cc



Again refer to the chart in lesson T-4 for metric units. Cubic measurement is easy, just use the chart but triple your count (three times)

example: $1 \text{ cu m} = \underline{\hspace{2cm}} \text{ cu dm}$ meter to decimeter is up

1, tripled 3 so multiply by 1,000 because it has 3 zeros. So, $1 \text{ cu m} = 1 \times 1,000 \text{ cu dm}$

$$1 \text{ cu m} = \underline{1,000} \text{ cu dm}$$

Try these now

11) $1 \text{ cu m} = \underline{\hspace{2cm}} \text{ cc}$ (cubic centimeter abbreviation)

12) $1 \text{ cc} = \underline{\hspace{2cm}} \text{ cu m}$ 13) $1 \text{ cc} = \underline{\hspace{2cm}} \text{ cu mm}$

14) $7 \text{ cu mm} = \underline{\hspace{2cm}} \text{ cu m}$ 15) $1 \text{ cu km} = \underline{\hspace{2cm}} \text{ cu m}$

16) $3.4 \text{ cu km} = \underline{\hspace{2cm}} \text{ cu m}$ 17) $.8 \text{ cu mm} = \underline{\hspace{2cm}} \text{ cu dm}$

18) $11.2 \text{ cu dkm} = \underline{\hspace{2cm}} \text{ cu km}$

19) $.0001 \text{ cu km} = \underline{\hspace{2cm}} \text{ cc}$

20) $1 \text{ cu km} = \underline{\hspace{2cm}} \text{ cu mm}$

MEASUREMENT (Metric System) T - 7

Name _____ Period _____ Date _____

Objective: You will know the metric units of mass and capacity.

Do you know what is meant by the "mass" of an object? The term mass refers to the amount of matter in the object. Since the metric system was invented by scientists, they knew that weight depended on gravity (which is a pull from the center of a planet). Since men have gone to the moon, we know that they weighed $\frac{1}{6}$ of their weight on earth on the moon because the moon's size is smaller, and that they are weightless in space. Did they lose that much on the trip? No. The amount of matter stayed the same but their weight changed because there is a loss of gravity on the moon. That's why the metric system uses mass (amount of matter) instead of weight.

The basic metric unit of mass is the gram (gm). A gram is defined as the mass of one cubic centimeter of water. So, 1 gram = 1cc (of water).

The gram is a very small mass. A one thousand gram mass, a kilogram (kgm), is almost equal to $2\frac{1}{5}$ pounds. In the metric system, it is easier to

use the kilogram than the gram for daily use. Just as all measures of length in the metric system are based on the meter, so all measures of mass are based on the gram. The prefixes used with the word meter, are used in the same way with the word gram. Look at the chart:

	1 milligram (mgm) = .001 gram
	1 centigram (cgm) = .01 gram
(1)	1 decigram (dgm) = _____ gram
	1 gram (gm) = 1 gram
(2)	1 decagram (dkgm) = _____ grams
(3)	1 hectogram (hgm) = _____ grams
(4)	1 kilogram (kgm) = _____ grams

The most commonly used masses are: gram, kilogram, metric ton. A kilogram is 1000 grams. A metric ton is 1,000,000 (one million grams).

Try these.

- (5) 1 kgm = _____ gm --- (going to a smaller unit multiply; move the decimal three places to the right)
- (6) 1 kgm = _____ hgm
- (7) 1 mgm = _____ gm --- (going to a larger unit divide; move the decimal three places to the left)
- (8) 1 metric ton = _____ gm
- (9) 1 metric ton = _____ kgm

Since 1 gram = 1cc (of water) by definition, a very simple and useful relationship between the volume of a container and the mass of water it can hold exists. For example, a container with a volume of 27 cubic centimeters can hold 27 grams of water.

- (10) What is the mass of 23 cubic centimeters of water? _____ grams
- (11) What is the volume of a container that holds 10 grams of water?

Name _____

- (12) A container with a volume of 1 cubic meter (1,000,000cc) contains water.
 What is the mass? _____ grams
 _____ kilograms
 _____ metric tons
- (13) If the mass of an object filled with water is 4kgms, what is the volume of the container? _____ cc
- (14) If a metal box has a volume of 45cc, what is the mass if filled with water? _____ grams

The volume of a container is often described in terms of so-called liquid measures such as a pint, the quart, and the gallon. And dry measures as the dry pint, the dry quart, the peck, and the bushel. We then use the term capacity instead of volume. In the metric system, the basic unit of capacity is the liter (l), which is slightly larger than the quart. A liter is used for all capacity units. There is no difference in liquid and dry measure. A liter is defined as the capacity of a cubical container with edges of length 10 centimeters. Such a container would have a volume of:

$$(10 \times 10 \times 10)\text{cc} = 1000\text{cc}$$

and could hold a mass of 1000gm (1 kgm) of water.

$$1000 \text{ gm of water (1 kgm)} = 1000\text{cc of water} = 1 \text{ liter of water}$$

Just as all measures of length in the metric system are based on the meter and all measures of mass in the metric system are based on the gram, all measures of capacity are based on the liter. The prefixes used with the words meter and gram, are used in the same way with the word liter. Look at this chart:

1 milliliter (ml)	=	.001 liter
1 centiliter (cl)	=	.01 liter
1 deciliter (dl)	=	.1 liter
1 liter	=	1 liter
(15) 1 decaliter (dkl)	=	_____ liters
(16) 1 hectoliter (hl)	=	_____ liters
(17) 1 kiloliter (kl)	=	_____ liters

The units you use most in science are the milliliter and the liter. What part of a liter is a milliliter? _____

- (18) 1L = _____ ml --- (going to a smaller unit, move the decimal three places to the right)
- (19) 5ml = _____ l
- (20) 47L = _____ ml

There is a relationship between volume, mass, and capacity.

$$1000\text{cc} = 1000 \text{ gm} = 1 \text{ liter}$$

$$1\text{cc} = 1 \text{ gm} = 1 \text{ ml}$$

- (21) A test tube has 7ml of water in it. The mass of water is _____ grams.
- (22) 5 liters of water = _____ cc = _____ gms = _____ kgms
- (23) 45 milliliters of water = _____ cc = _____ gms
- (24) A chemist diluted 75cc of acid with 26cc of water. How many milliliters of the solution were there? _____
- (25) 1 metric ton of water = _____ liters
 (1 metric ton = 1000 kgm)
 (1 kgm = 1 liter)

Name _____ Period _____ Date _____

Objective: You will be able to solve problems using the metric system.

Advantages of the metric system.

I Extreme Simplicity

The entire metric system can be shown in three simple tables of 6 lines.

	10 mm = 1 cm
Length	100 cm = 1 m
	1000 m = 1 km
Capacity	1000 cc = 1 liter
Mass	1000 g = 1 km
(weight)	1000 kg = 1 ton

II The decimal division of its units.

In converting any unit to smaller units, we multiply by 10, 100 or 1000, which means moving the decimal point to the right.

In converting any larger units we divide by 10,000 or 1000, which means simply moving the decimal point to the left.

III The interrelation of units of length, capacity and mass

A unit of mass of water (the gram) has as its cubic content one unit of capacity (the cc), and this in turn has as each of its dimensions one unit of length (the m).

$$(1000 \text{ cc} = 1000 \text{ gram} = 1 \text{ liter})$$

This is a most marvelous and far reaching provision for computation when using the metric system.

See what you remember about the metric system.

Matching

- | | |
|-------------------------------|----------|
| 1) The basic unit of length | a) liter |
| 2) The basic unit of mass | b) gram |
| 3) The basic unit of capacity | c) meter |

- 4) 25 cc of water has a mass of _____ grams.

The prefixes in the metric system are the same for units of length, mass and capacity. The words underlined below are the most commonly used units.

prefix	Length	Mass	Capacity	
milli	<u>meter</u>	gram	<u>liter</u>	(going up to a smaller unit move decimal to the right)
centi	<u>meter</u>	gram	<u>liter</u>	
deci	<u>meter</u>	gram	<u>liter</u>	
	<u>meter</u>	<u>gram</u>	<u>liter</u>	
deca	<u>meter</u>	gram	<u>liter</u>	(Going down to a larger unit move decimal to the left)
hecto	<u>meter</u>	gram	<u>liter</u>	
kilo	<u>meter</u>	<u>gram</u>	<u>liter</u>	

- 5) 5 m = _____ mm (going up move decimal point three places to the right)
- 6) 6 ml = _____ l (going down move decimal point three places to the left)
- 7) 7 kgm = _____ gm
- 8) 8 cm = _____ mm
- 9) 7 m = _____ km
- 10) 9 ml = _____ l
- 11) 2 l = _____ ml
- 12) 6 gm = _____ kgm
- 13) 200 kgm = _____ metric tons
- 14) 7 km = _____ m
- 15) 4 kgm = _____ gm

16) A meter is slightly _____ than a yard.
(longer, shorter)

17) A liter is slightly _____ than a quart.
(larger, smaller)

18) A gram is _____ than an ounce.
(smaller, larger)

19) A kilogram is _____ than a pound.
(smaller, larger)

20) The prefix centi means hundred. A centipede is an insect with _____ legs.
A century is _____ years.

21) Remember 1 cc = 1 gram = 1 ml so, 1000cc = _____ gram = _____ ml
but 1000 grams = _____ kg and
1 ml = _____ l
so 1000 cc = _____ kg = _____ l

22) A container that has a capacity of 27 cc is filled with water. What is the mass of the water? _____

23) 3.5 cc = _____ grams = _____ ml

24) 1.4 l = _____ kgms = _____ cc

25) 300 grams = _____ cc = _____ ml

Remember to make computations with the metric system. (Change to same unit then add)

example: 5 m 6cm = 5.6 m

+ 3 m 5cm = 3.5 m
9.1 m = 9 m 1cm

26) 4 l 800 ml = 4.8 l

+ 3 l 400 ml = _____

_____ l _____ ml

27) 4 kgm 800 gms = 4.8 kgm
- 2 kgm 900 gms = _____ kgm

28) 3 kgm 700 gms

- 1 kgm 900 gms

29) 6 l 50 ml = 6.050 l

- 4 l 200 ml _____ l

30) 4) 5 m 4 dm 3 cm 6 mm

LEVEL T A-CHECKPOINT 5-8

Name _____

Period _____

Metric System

Date _____

Do these problems.

1) a)
$$\begin{array}{r} 3\text{m } 2\text{dm } 8\text{cm} \\ + 2\text{m } 8\text{dm } 7\text{cm} \\ \hline \text{m } \text{dm } \text{cm} \end{array}$$

b)
$$\begin{array}{r} 4\text{m } 7\text{dm } 6\text{cm} \\ - 3\text{m } 8\text{dm } 7\text{cm} \\ \hline \text{m } \text{dm } \text{cm} \end{array}$$

2) a)
$$\begin{array}{r} 3\text{dm } 8\text{cm } 4\text{mm} \\ \times 4 \\ \hline \text{m } \text{dm } \text{cm } \text{mm} \end{array}$$

b)
$$6 \overline{) 4\text{m } 1\text{dm } 4\text{cm}}$$

answer is _____ dm

or

_____ m

(T-5)

3) a) $6\text{sq cm} = \text{sq mm}$

b) $24\text{sq m} = \text{sq cm}$

c) $7\text{sq km} = \text{sq m}$

d) $2.3\text{sq cm} = \text{sq m}$

4) cc means _____

Give an example of how cc is used.

5) a) $4\text{cc} = \text{cu m}$

b) $7\text{cu km} = \text{cu m}$

c) $18\text{cu m} = \text{cc}$

d) $3\text{cu m} = \text{cu mm}$

(T-6)

6) What is the basic unit of capacity in the metric system?

a) _____

b) What is the basic unit of mass in the metric system?

7) a) $6\text{gm} = \text{mgm}$

b) $7\text{kgm} = \text{gm}$

c) $47\text{cc of water} = \text{gm}$

d) $8\text{ metric tons} = \text{kgm}$

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Level T A-Checkpoint 5-8

(con't)

8) a) 1cc = gm = ml

b) 1ml = l

c) 8l = cl

d) .6l = ml

(T-7)

9) a) 8m = cm

b) 2mm = m

c) 4sq m = sq cm

d) 6cc = cu m

10) a) 8ml = l

b) 32cc = ml

c) 4kgm = gm

d) 16gm = cc

(T-8)

LEVEL T CHECKPOINT 5-8

Name _____

Period _____

Metric System

Date _____

Do These:

1) a)
$$\begin{array}{r} 1\text{m } 3\text{dm } 8\text{cm } 4\text{mm} \\ + \quad 8\text{dm } 3\text{cm } 7\text{mm} \\ \hline \end{array}$$

 _____ m _____ dm _____ cm _____ mm

b)
$$\begin{array}{r} 16\text{m} \\ - 4\text{m } 3\text{dm } 2\text{cm} \\ \hline \end{array}$$

 _____ m _____ dm _____ cm

2) a)
$$\begin{array}{r} 1\text{m } 3\text{dm } 2\text{cm } 4\text{mm} \\ \times 6 \\ \hline \end{array}$$

 _____ m _____ dm _____ cm _____ mm

b)
$$\begin{array}{r} 5\text{m } 4\text{dm } 2\text{cm } 5\text{mm} \\ \hline \end{array}$$

answer is

_____ dm

or

_____ m

(T-5)

3) a) $4\text{sq cm} = \text{_____ sq mm}$ b) $6\text{sq m} = \text{_____ sq cm}$

c) $16\text{ sq km} = \text{_____ sq m}$ d) $1.7\text{sq cm} = \text{_____ sq m}$

4) cc means _____

Give an example of how cc is used. _____

5) a) $1\text{ cc} = \text{_____ cubic mm}$

b) $1\text{ cu km} = \text{_____ cu m}$

c) $4\text{ cu m} = \text{_____ cc}$

d) $16\text{ cu mm} = \text{_____ cu m}$

(T-6)

6) a) What is the basic unit of mass in the metric system.

b) What is the basic unit of capacity in the metric system?

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Level T checkpoint 5-8 (con't)

- 7) a) 6kgm = _____ gm b) 23cc of water = _____ grams
c) 1 metric ton = _____ km d) 4 mgm = _____ gm

- 8) a) 1 L = _____ ml b) 6 ml = _____ cl
c) 2 ml = _____ L d) 1cc = _____ gm = _____ ml

(T-7)

- 9) a) 4m = _____ cm b) 6mm = _____ cm
c) 1sq m = _____ sq cm d) .7cc = _____ cu m

- 10) a) 7ml = _____ l b) 4mgm = _____ gm
c) 6kgm = _____ gm d) 27cc = _____ ml

(T-8)

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POSTTEST LEVEL T

Name _____

Period _____

Measurement (Metric System)

Date _____

1) The metric system is _____ than the English system.

2) Is a hogshead a unit of the metric system or the English system? _____

3) What country invented the metric system? _____

(T-1)

Measure the following line segments:

4) _____ cm

5) _____ cm _____ mm

6) 1cm = _____ mm

(T-2)

7) $24 \times 100 =$ _____

8) $5.7 \div 1000 =$ _____ 9) A millimeter is _____ of a meter.

10) 1 meter = _____ centimeter

(T-3)

11) Complete the chart.

a. millimeter	(mm)	.001 meter
b. _____	(cm)	.01 meter
c. decimeter	_____	.1 meter
d. meter	(m)	1 meter
e. decameter	(dkm)	_____ meters
f. hectometer	_____	100 meters
g. _____	(km)	1000 meters

12) 1 km = _____ m

13) 1 mm = _____ m

14) 6m = _____ cm

15) 4mm = _____ cm

16) The basic unit of length in the metric system is the _____.

(T-4)

17) $\begin{array}{r} 3\text{cm} \quad 5\text{mm} \\ + 2\text{cm} \quad 7\text{mm} \\ \hline \end{array}$

18) $\begin{array}{r} 4\text{dm} \\ - 2\text{dm} \quad 1\text{cm} \\ \hline \end{array}$

(T-5)

Level T Posttest (con't)

19)
$$\begin{array}{r} 2\text{cm} \quad 4\text{mm} \\ \times 3 \\ \hline \end{array}$$

20)
$$6 \overline{) 3\text{cm} \quad 6\text{mm}}$$

(T-5)

21) $1 \text{ sq. m} = \underline{\hspace{2cm}} \text{ sq. cm}$

22) $5 \text{ sq. mm} = \underline{\hspace{2cm}} \text{ sq. cm}$

23) A cubic centimeter is abbreviated (symbol).

24) $1 \text{ cc} = \underline{\hspace{2cm}} \text{ cu. mm}$

(T-6)

25) The basic unit of mass in the metric system is the .

26) The basic unit of capacity in the metric system is the .

27) $1 \text{ metric ton} = \underline{\hspace{2cm}} \text{ kgm}$

28) $1 \text{ cc} = \underline{\hspace{1cm}} \text{ ml} = \underline{\hspace{1cm}} \text{ gm}$

$\underline{\hspace{1cm}} \text{ cc} = \underline{\hspace{1cm}} \text{ l} = \underline{\hspace{1cm}} \text{ l kgm}$

29) What is the mass of 23 cubic centimeters of water? grams

30) Dry and liquid measures use the same units in the

 (metric/English)

(T-7)

31) The decimal system is related to the system.
(metric/English)

32) A liter is slightly than a quart.
(larger/smaller)

33) Do one of the following problems:

a. $1 \text{ mile} = \underline{\hspace{2cm}} \text{ inches}$ or (b) $1 \text{ km} = \underline{\hspace{2cm}} \text{ mm}$

34) Give two examples of the use of the metric system in the United States today.

35) If a mile = $\frac{8}{5}$ kilometers, how far is it to San Francisco?
(45 miles) km

36) A paper clip is about grams.

(T-8)

PRETEST LEVEL U

NAME _____

PERIMETER AND AREA

PERIOD _____

DATE _____

1) The distance around a polygon is called the _____.

MATCHING (use correct letter) Match Perimeter formulas to polygons

2) _____ Triangle

a) $p = 2 (l + w)$

_____ Rectangle

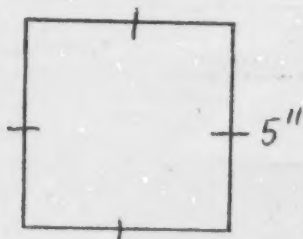
b) $p = a + b + c$

_____ Square

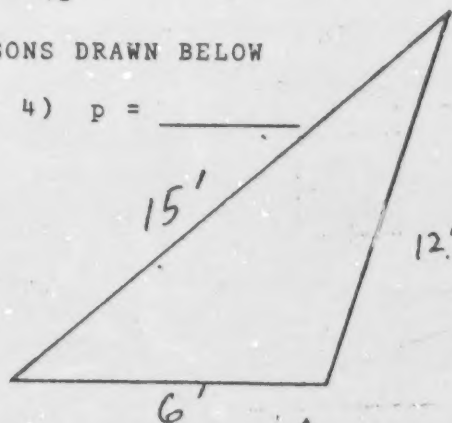
c) $p = 4s$

FIND THE PERIMETERS OF THE POLYGONS DRAWN BELOW

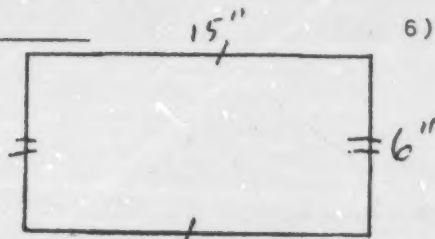
3) $p =$ _____



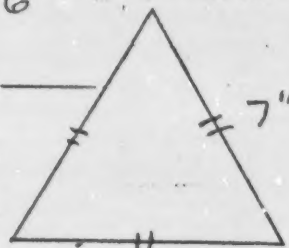
4) $p =$ _____



5) $p =$ _____

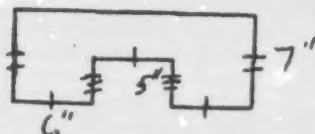


6) $p =$ _____



(U-1)

7) $p =$ _____



8) $p =$ _____



(U-2)

9) The distance around a circle is called the _____.

10) π has the same value for all circles. (True or False) _____

11) If the diameter of a circle is 10", then the radius is _____.

FIND THE CIRCUMFERENCE OF THE CIRCLES DESCRIBED BELOW

12) $r = 7''$, $C =$ _____

13) $d = 10''$, $C =$ _____

use $\frac{22}{7}$ for π

use 3.14 for π

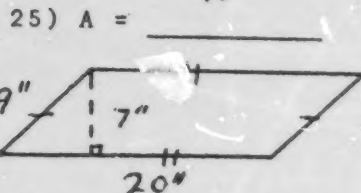
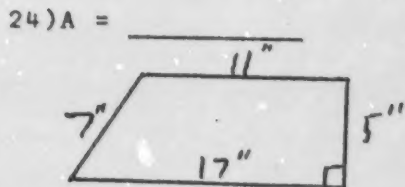
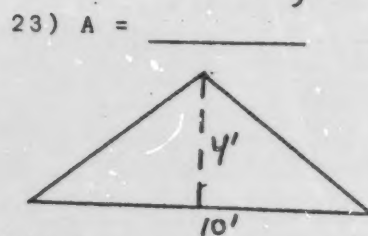
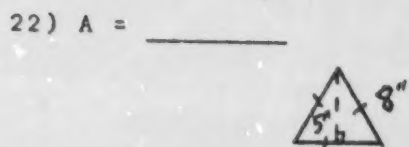
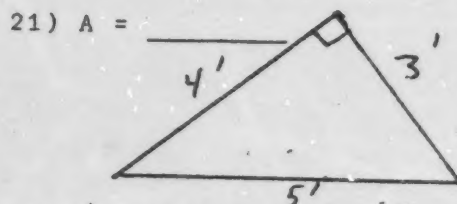
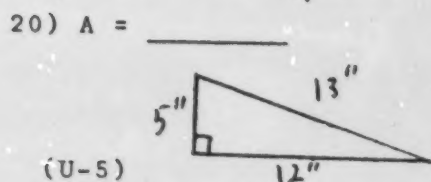
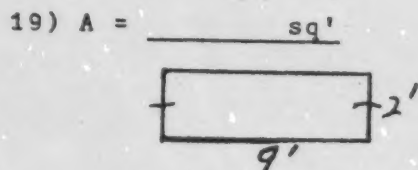
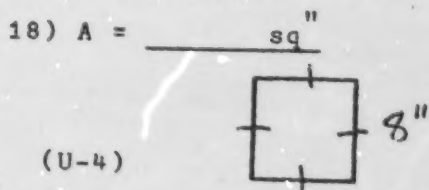
(U-3)

MATCHING (use correct letter) Match area formulas to polygons and a circle.

- | | | |
|-----------|---------------------|------------------------------------|
| 14) _____ | Trapezoid (U-7) | a) $A = l w$ |
| _____ | Parallelogram (U-7) | b) $A = \frac{1}{2} (b_1 + b_2) h$ |
| 15) _____ | Triangle (U-5,6) | c) $A = s^2$ |
| _____ | Circle (U-8) | d) $A = \frac{1}{2} b h$ |
| 16) _____ | Square (U-4) | e) $A = b h$ |
| _____ | Rectangle (U-4) | f) $A = \pi r^2$ |

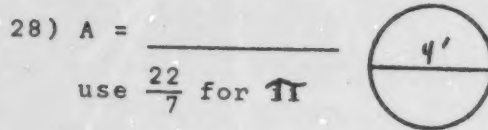
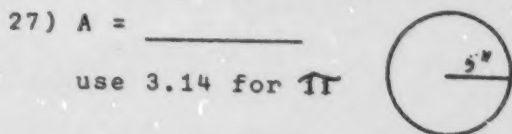
17) Area is measured in (square or cubic) _____ units.

FIND THE AREA OF THE FOLLOWING POLYGONS AND CIRCLES



26) Area of a parallelogram with a base of 20 yards and a height of 15 yards.

(U-7) $A =$ _____



29) $r = \frac{1}{2}$ ", $A =$ _____

use $\frac{22}{7}$ for π

30) $d = 20'$, $A =$ _____

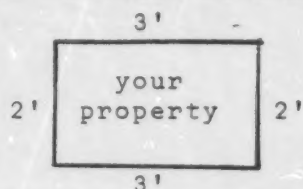
use 3.14 for π

PERIMETER AND AREA U-1

Name _____ Date _____ Period _____

Objective: You will be able to find the perimeter of a triangle, rectangle or square.

If you want to put a fence around your property, you would need to know the distance around the outside edge. This is called the perimeter.



The perimeter of your property would be the sum of all the sides.

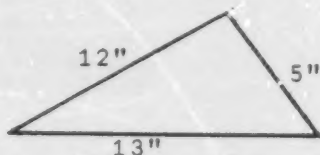
$$\text{Perimeter} = 2' + 3' + 2' + 3' = 10'$$

- 1) The distance around a polygon is called the _____.
- 2) To find the perimeter of a polygon you _____ (add, subtract, multiply, divide) all the sides together.

TRIANGLES

The most simple polygon is a triangle (3 sides). The perimeter can be found by adding the 3 sides together.

Example)

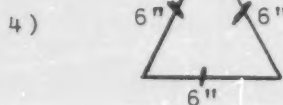


$$P = 5'' + 12'' + 13''$$

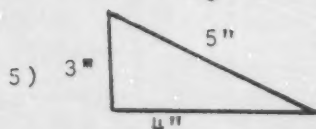
$$P = 30''$$



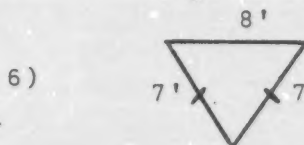
$$P = \underline{\hspace{2cm}}$$



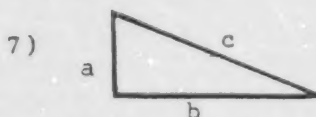
$$P = \underline{\hspace{2cm}}$$



$$P = \underline{\hspace{2cm}}$$



$$P = \underline{\hspace{2cm}}$$



$$P = \underline{a + b + c}$$

This is the formula for the perimeter of a triangle. a, b, and c are the three sides of any triangle.

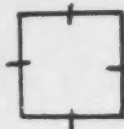
Find the perimeter of these triangles.

	a	b	c	P
8)	7''	8''	9''	_____
9)	21'	17'	20'	_____
10)	5''	5''	5''	_____

Squares

A square is a polygon with all four sides the same length. $S =$ sides so the perimeter is $s + s + s + s$, We add the length of a side 4 times so $p = 4 \times s$

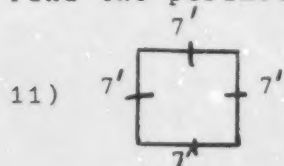
Example)



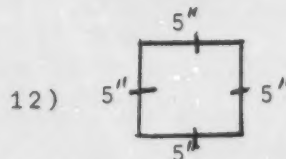
3"

$$p = 4 \times s = 4 \times 3 = 12''$$

Find the perimeter of these squares.



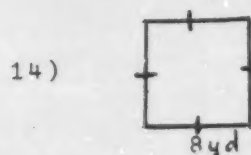
$$p = \underline{\hspace{2cm}}$$



$$p = \underline{\hspace{2cm}}$$



$$p = \underline{\hspace{2cm}}$$

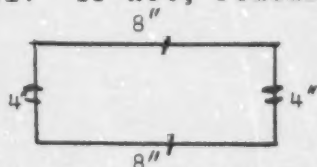


$$p = \underline{\hspace{2cm}}$$

15) What is the perimeter of a square with one side a length of 6 inches? $\underline{\hspace{2cm}}$

Rectangles

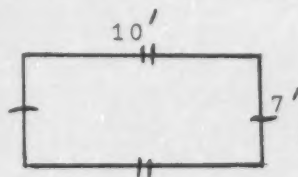
Do you remember that a rectangle has opposite sides equal and parallel? If not, remember now!!



We usually call the shortest sides of a rectangle the width (w) and the longest sides the length (l).

Perimeter = $4 + 8 + 4 + 8$. We add the 2 widths and 2 lengths together, $p = 2 \times w + 2 \times l$, so $p = (2 \times 4) + (2 \times 8) = 24$. Another way to find the perimeter is to add the width and length together then double it (times two) $p = 2(l + w)$

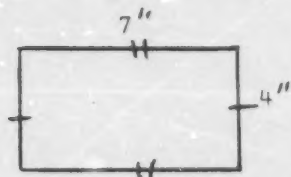
Example)



$$p = 2(10 + 7)$$

$$p = 2(17) = 34'$$

16)



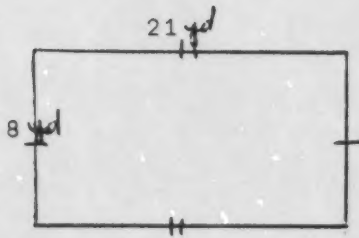
$$p = 2(l + w)$$

$$l = \underline{\hspace{2cm}} \quad w = \underline{\hspace{2cm}}$$

$$p = 2(\underline{\hspace{2cm}} + \underline{\hspace{2cm}})$$

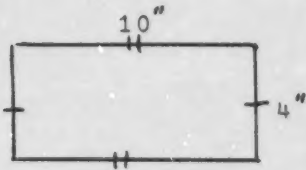
$$p = 2(\underline{\hspace{2cm}}) = \underline{\hspace{2cm}}$$

17)



$p =$ _____

18)

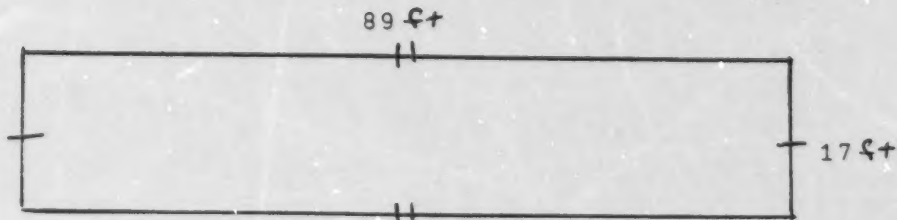


$p =$ _____

19) $p =$ _____
 $l = 5', w = 4'$

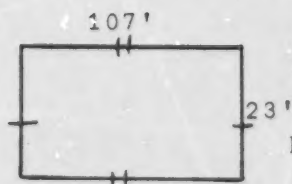
20) $p =$ _____
 $l = 9'', w = 8''$

21)



$p =$ _____

22)



$p =$ _____

23)



$p =$ _____

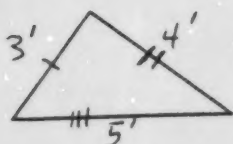
Name _____ Period _____ Date _____

Objective: You will be able to find the perimeter of any polygon.

1. The distance around any polygon is called the _____.
2. The formula for the perimeter of a rectangle is _____.
($P = 4 \times s$ or $P = 2(l + w)$)
3. The formula for the perimeter of a square is _____.
($P = 4 \times s$ or $P = 2(l + w)$)

Find the perimeters of the following polygons. (add the sides up)

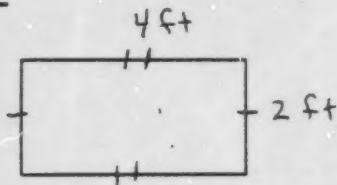
4. $p =$ _____



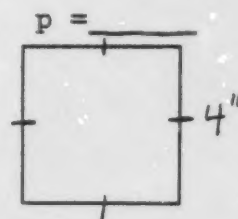
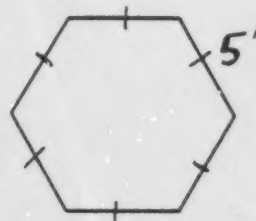
5. The slash marks tell us that the sides are equal, because there is the same number of marks on each side.

6. The slash marks show that opposite sides are equal.

$p =$ _____



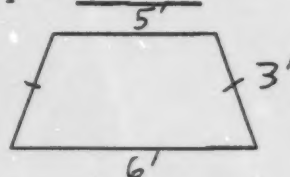
7. $p =$ _____



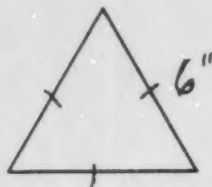
8. $p =$ _____



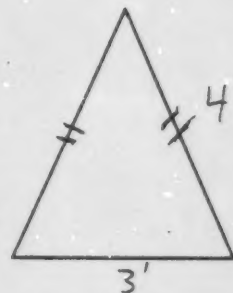
9. $p =$ _____



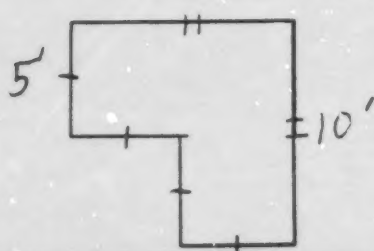
10. $p =$ _____



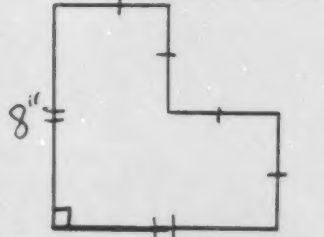
11. $p =$ _____



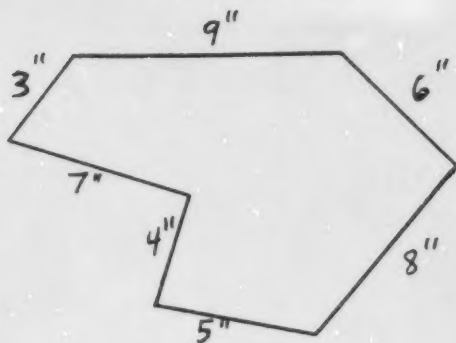
12. $p =$ _____



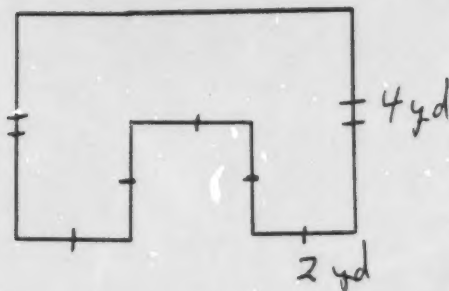
13. $p =$ _____



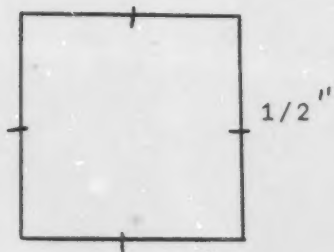
14. $p =$ _____



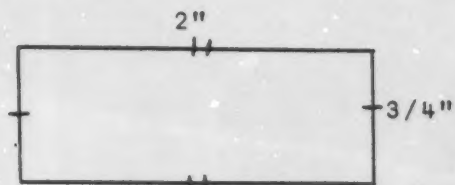
15. $p =$ _____



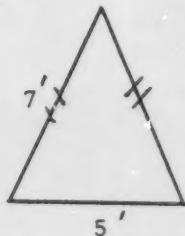
16. $p =$ _____



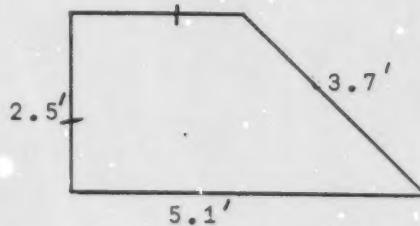
17. $p =$ _____



18. $p =$ _____



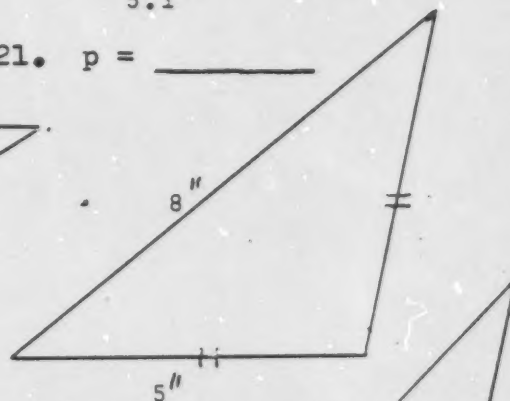
19. $p =$ _____



20. $p =$ _____



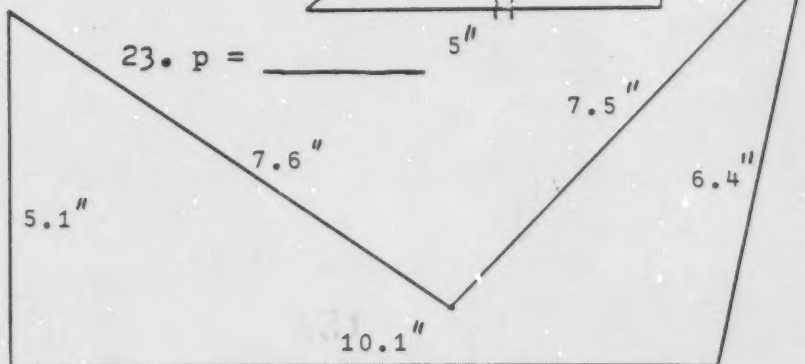
21. $p =$ _____



22. $p =$ _____

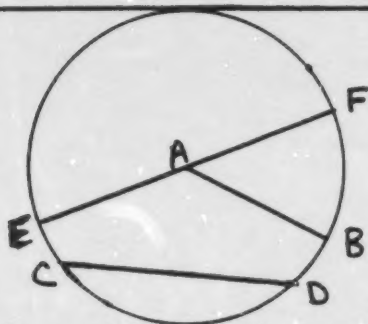


23. $p =$ _____



Name _____ Period _____ Date _____

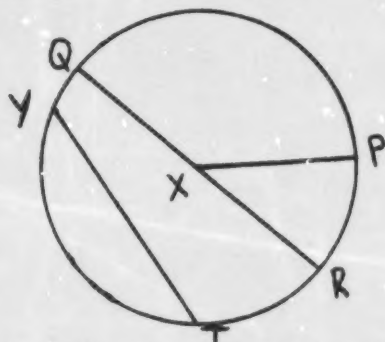
Objective: You will be able to use radius, diameter and π to find the circumference of a circle.



Point A is called the center point.
Line segment AB ($\overline{AB}$) from the center to the edge of the circle is called the radius.

$\overline{CD}$ is called a chord. It is a line segment with both end points on the edge of the circle.

$\overline{EF}$ is a chord that passes through the centerpoint. $\overline{EF}$ is called the diameter. It is the longest chord of a circle.



- 1) Point X is the _____.
- 2) $\overline{XP}$ is called the _____.
- 3) $\overline{YT}$ is called the _____.
- 4) $\overline{QR}$ is called the _____.

In the circle above the diameter $\overline{QR}$ is made up of two radii $\overline{QX}$ and $\overline{XR}$. So d (diameter) = $2 \times r$ (radius) $d = 2 \times r$

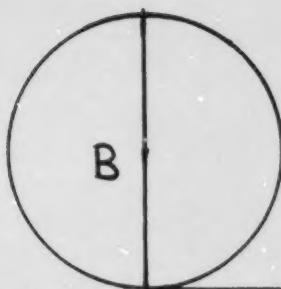
- 5) If $r = 5$, $d =$ _____
- 6) $r = 7$, $d =$ _____
- 7) $r = 10$, $d =$ _____
- 8) $r = 3$, $d =$ _____

If we know what the diameter is, the radius will be half of it,
so $r = \frac{d}{2}$

Example) $d = 10$ $r = \frac{10}{2} = 5$

Find the radius of each circle with diameters of:

- 9) $d = 20$, $r =$ _____
- 10) $d = 16$, $r =$ _____
- 11) $d = 30$, $r =$ _____
- 12) $d = 4$, $r =$ _____



If you roll a circle one time around you will have the length of the circumference. Circle "A" has a smaller diameter so its circumference is smaller than Circle "B".

If you kept rolling different circles you would see that the larger the diameter, the longer the circumference. There seems to be a relationship (ratio) between the length of the circumference and the diameter. If you divide the circumference of any circle by its diameter, you will get a ratio called pi. Its symbol is π . π is approximately equal to 3.14 or $\frac{22}{7}$.

13) This symbol π is called _____.

14) It is approximately equal to $\frac{22}{7}$ or _____.

To find the circumference of a circle, multiply π by the diameter.

$$c = \pi d$$

or since $d = 2 \times r$

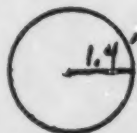
$$c = 2\pi r$$

Find the circumference of the following circles.

Use 3.14 for π

Use $\frac{22}{7}$ for π

Example)



$$\begin{aligned} c &= 2\pi r \\ c &= 2(3.14)1.4 \\ c &= 2.8(3.14) \\ c &= 8.792' \end{aligned}$$

Example)



$$\begin{aligned} c &= \left(\frac{22}{7}\right)4 \\ c &= \frac{88}{7} \\ c &= 12\frac{4}{7}'' \end{aligned}$$

15)



$$\begin{aligned} c &= \pi d \\ c &= \frac{22}{7} \times \underline{\hspace{1cm}} \\ c &= \underline{\hspace{1cm}} \end{aligned}$$

16)



$$\begin{aligned} c &= \pi d \\ c &= (3.14) \underline{\hspace{1cm}} \\ c &= \underline{\hspace{1cm}} \end{aligned}$$

Use $\frac{22}{7}$ for π in problems 17 to 20.

17) $d = 10'$, $r = \underline{\hspace{1cm}}$, $c = \underline{\hspace{1cm}}$

18) $d = \underline{\hspace{1cm}}$, $r = 7'$, $c = \underline{\hspace{1cm}}$

19) $d = 1'$, $r = \underline{\hspace{1cm}}$, $c = \underline{\hspace{1cm}}$

20) $d = \underline{\hspace{1cm}}$, $r = 3'$, $c = \underline{\hspace{1cm}}$

Use 3.14 for π in problems 21 to 24.

21) $d = 1.14$ $c = \underline{\hspace{1cm}}$

22) $r = .24$ $c = \underline{\hspace{1cm}}$

23) $d = 34$ $c = \underline{\hspace{1cm}}$

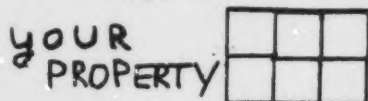
24) $r = 9.14$ $c = \underline{\hspace{1cm}}$

Name _____ Period _____ Date _____

Objective: You will be able to find the area of rectangles and squares.

Rectangles

In lesson U-1, you put a fence around "your property", now you want to cement it. You will need to know the area of your property. Area tells how many squares (1 unit by 1 unit) there are in a figure.

In "your property" there are 6

squares. What is $2 \times 3 =$ _____? The shorter side of the rectangle is the width (w), the longer side of the rectangle is the length (l).
 $A = l \times w$; $A = 3 \times 2$; $A = 6$ square units.

TO FIND THE AREA OF A RECTANGLE multiply the length times the width.
 $A = l \times w$. Remember all answers when finding area are given in square units.

FIND THE AREA OF THESE RECTANGLES, check by counting the squares.

1)



$A = l \times w$

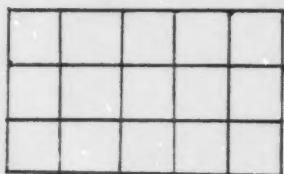
$A =$ _____ sq. units

2)



$A =$ _____ sq. units

3)



Area = _____

4)



Area = _____

5)



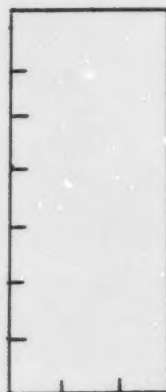
Area = _____

6)



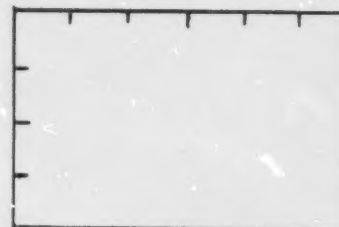
Area = _____

7)



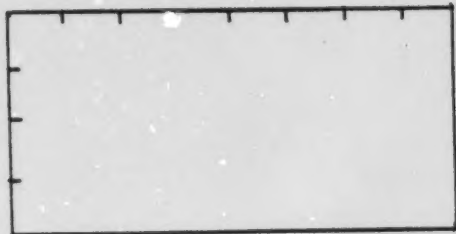
Area = _____

8)



Area = _____

9)



Area = _____

10)



Area = _____

Squares

A square is a rectangle with all four sides the same. So the length (l) and width (w) are the same. We use (s) for sides so $A = s \times s$ or $A = s^2$.

FIND THE AREA OF THESE SQUARES

Example)



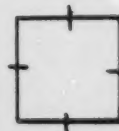
$A = s \times s$
 $A = 2 \times 2$
 $A = 4$ square units

11)



$A = s \times s$
 $A =$ _____

12)

 $A =$ _____13) $s = 7'$, $A =$ _____14) $s = 12'$, $A =$ _____15) $s = 1/2''$, $A =$ _____Review time

U-1 to U-4

16) The distance around a polygon is called the _____.

17) The distance around a circle is called the _____.

18) $\pi = 3.14$ or _____19) $A = l \times w$ is the formula for the area of a _____.20) $A = s^2$ is the formula for the area of a _____.

1) The distance around a polygon is called the _____.

2) MATCHING (Use correct letter)
Match formulas to the polygons named

_____ Rectangle

a) $p = a + b + c$

_____ Triangle

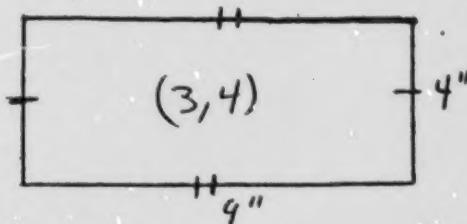
b) $p = 2(1 + w)$

_____ Square

c) $p = 4s$

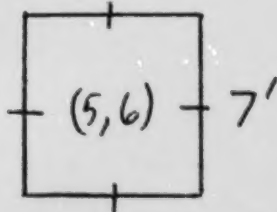
FIND THE PERIMETERS AND AREAS OF THE FIGURES BELOW

3) $p =$ _____



4) $A =$ _____ sq"

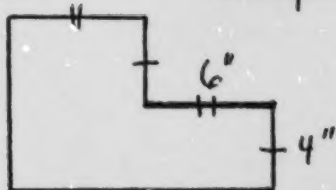
5) $p =$ _____



6) $A =$ _____ sq'

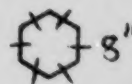
(U-1)

7) $p =$ _____



(U-4)

8) $p =$ _____



(U-2)

FIND THE CIRCUMFERENCE OF THE CIRCLES BELOW

9)

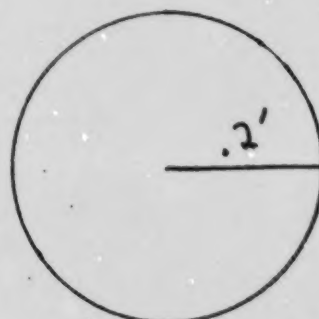
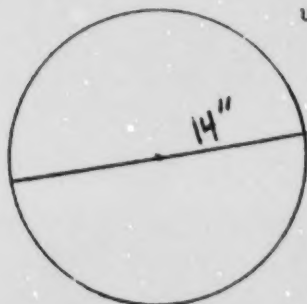
$C =$ _____

10)

$C =$ _____

use $\frac{22}{7}$ for π

use 3.14 for π



(U-3)

LEVEL U A- Checkpoint 1-4

Name _____

Period _____

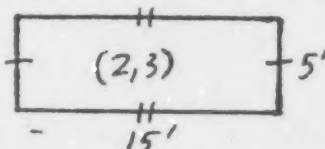
Date _____

Perimeter and Area

1) The distance around a polygon is called the _____.

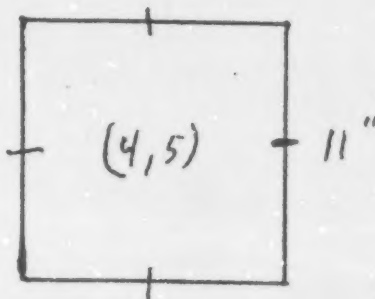
FIND THE PERIMETER AND AREA OF THE FOLLOWING FIGURES BELOW

2) $p =$ _____



3) $A =$ _____ sq'

4) $p =$ _____

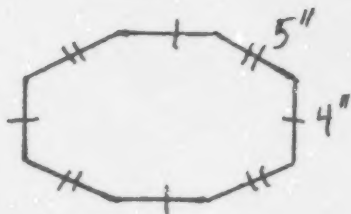


5) $A =$ _____ sq"

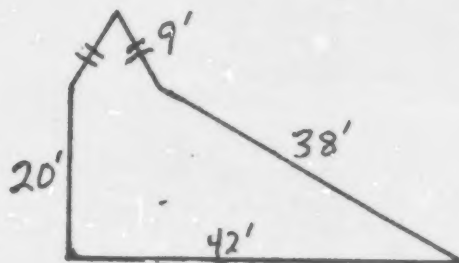
(U-1)

(U-4)

6) $p =$ _____



7) $p =$ _____



(U-2)

8) The distance around the edge of a circle is called the _____.

FIND THE CIRCUMFERENCE OF THE CIRCLES BELOW

9) $C =$ _____

use $\frac{22}{7}$ for π



10) $C =$ _____

use 3.14 for π



(U-3)

Name _____ Period _____ Date _____

Objective: You will be able to find the area of a right triangle.

If a triangle has one angle measuring 90° , it is a special form called a "right triangle". All these below are "right Triangles".

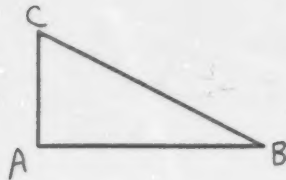


Fig. 1

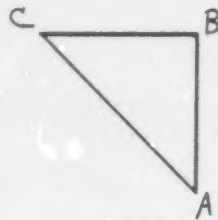


Fig. 2



Fig. 3

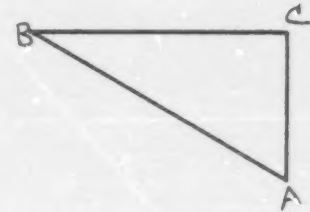
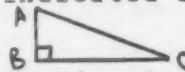


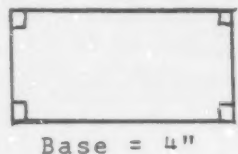
Fig. 4

Name the right angle in each of the figures above:

- 1) In fig. 1, the right angle is ____.
- 2) In fig. 2, the right angle is ____.
- 3) In fig. 3, the right angle is ____.
- 4) In fig. 4, the right angle is ____.
- 5) In right triangles, the right angle is indicated by a little square. The right angle is ____.
- 6) Below, draw two different looking right triangles and indicate with a little square which angles are the right angles.

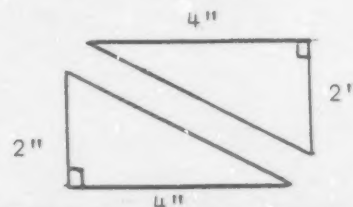
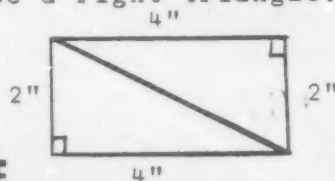


You know how to find the area of a rectangle by multiplying the length times the width. We are going to change the names of the measures. Instead of length and width, we call the sides "base" and "height".



Height = 2"
 $A = B \times H$
 $A = 4 \times 2$
 $A = 8 \text{ sq. in.}$

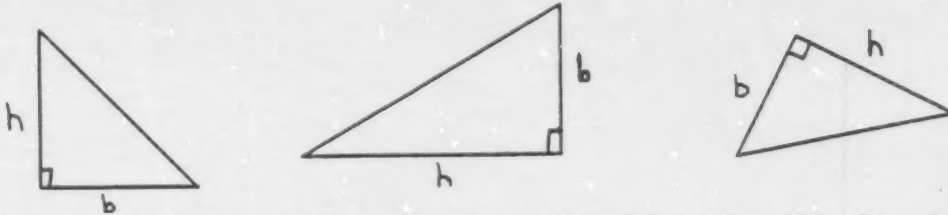
Draw a line segment from one corner of a rectangle to the opposite corner and you will divide the rectangle into matching halves. Each half will be a right triangle.



(7) The area of the rectangle above is $2 \times 4 =$ _____ sq. in.

(8) The area of one of the triangles must be $\frac{1}{2}$ of this or $\frac{1}{2} \times 8 =$ _____ sq. in.

The area of any right triangle can be found if the base and height are known. The base and height are always at a right angle to each other, that is, they are perpendicular.



If the base and height are known, the area is found by using this formula:

$$\text{Area} = \frac{1}{2} \times b \times h \quad \text{or} \quad A = \frac{b \times h}{2}$$

(9) Find the area of a right triangle with a base of 8" and a height of 9".

$$A = \frac{8 \times 9}{2} = \frac{72}{2} = \text{_____ sq. in.}$$

(10) Find the area of a right triangle with a base of 10 meters and a height of 10 meters.

$$A = \frac{10 \times 10}{2} = \frac{\text{_____}}{2} = \text{_____ sq. meters.}$$

(11) Find the area of a right triangle with a base of 20 cm and a height of 15 cm.

$$A = \frac{20 \times 15}{2} = \text{_____ sq. cm.}$$

Find the areas of these right triangles with the measures given.

(12) $h = 13'$ $b = 10'$ (13) $h = 5$ yds. $b = 8$ yds.

(14) $h = 8$ meters $b = 11$ meters (15) $h = 18$ in. $b = 12$ in.

(16) $h = 2$ miles $b = 1$ mile (17) $h = 1$ cm $b = 1$ cm

(18) $h = 9$ ft. $b = 7$ ft. (19) $h = 22$ ft. $b = 11$ ft.

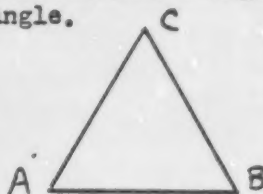
(20) $h = 12$ Km $b = 12$ Km

Name _____ Period _____ Date _____

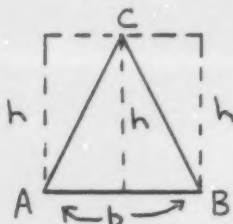
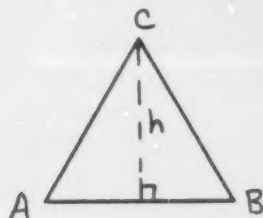
Objective: You will be able to find the area of a triangle.

In the last packet you learned how to find the area of a right triangle. Now you will learn how to find the area of any triangle.

This is a typical triangle.



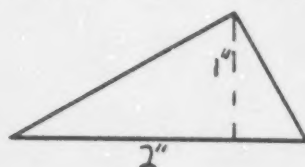
If a line segment is drawn from point C perpendicular to the base AB, two right _____ are created with an altitude "h" shared between them.



We could again consider that we have a rectangle formed. Since there are twice as many triangles within the rectangle above we need to divide the area of the rectangle by 2.

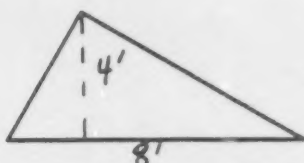
The formula again is: $\text{Area} = \frac{bh}{2}$ or $A = \frac{1}{2}bh$

(1) Find the areas of these triangles which have the bases and altitudes marked.



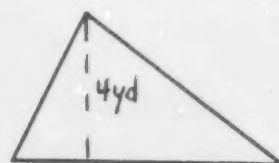
$$A = \underline{\quad} \times \underline{\quad} \times \frac{1}{2}$$

$$A = \underline{\quad}$$



$$A = \underline{\quad} \times \underline{\quad} \times \frac{1}{2}$$

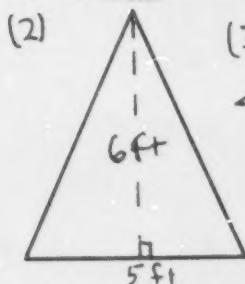
$$A = \underline{\quad}$$



$$A = \underline{\quad} \times \underline{\quad} \times \frac{1}{2}$$

$$A = \underline{\quad}$$

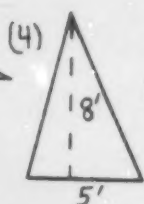
Notice again that the base and the altitude must be at a right angle to each other. Find the areas of these triangles, using the bases and altitudes as shown.



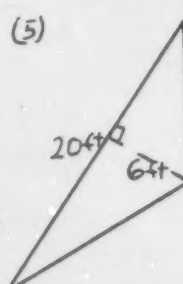
$$A = \underline{\quad}$$



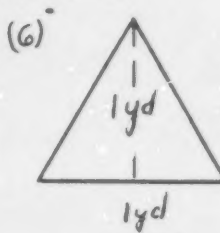
$$A = \underline{\quad}$$



$$A = \underline{\quad}$$



$$A = \underline{\quad}$$



$$A = \underline{\quad}$$

Find the areas of these triangles with bases and altitudes given.

(7) $h = 20 \text{ ft}, b = 5 \text{ ft}$

$$A = b \times h \times \frac{1}{2}$$

$$A = 20 \times 5 \times \frac{1}{2}$$

$$A = \underline{\hspace{2cm}}$$

(8) $h = 40 \text{ cm}, b = 10 \text{ centimeters}$

$$A = \underline{\hspace{2cm}}$$

(9) $h = 22 \text{ ft}, b = 11 \text{ ft}$

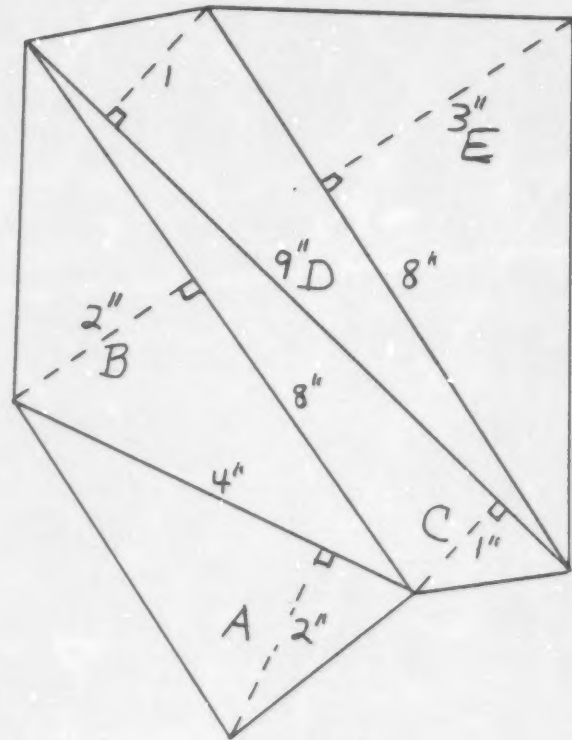
$$A = \underline{\hspace{2cm}}$$

(10) $h = 120 \text{ meters}, b = 60 \text{ meters}$

$$A = \underline{\hspace{2cm}}$$

The triangle is the basic outline used in finding land measures. If a surveyor wants to find the area of an outline of land, he will probably divide the outline into a set of triangles. Find the area of this set of triangles and add the areas together.

On the left side below is an outline. On the right it was "triangulated" (divided into triangles).



Dotted lines represent altitudes. Find the areas of the small Δ 's.

Area of triangle A = $\underline{\hspace{2cm}}$

Area of triangle B = $\underline{\hspace{2cm}}$

Area of triangle C = $\underline{\hspace{2cm}}$

Area of triangle D = $\underline{\hspace{2cm}}$

Area of triangle E = $\underline{\hspace{2cm}}$

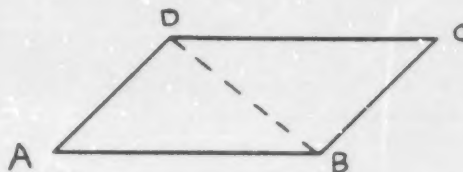
Total Area = $\underline{\hspace{2cm}}$

PERIMETER AND AREA U - 7

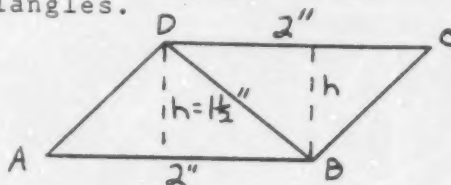
Name _____ Period _____ -Date _____

Objective: You will be able to find the area of parallelograms and trapezoids.

Given the parallelogram marked ABCD



If a diagonal line segment is drawn from B to D, we divide the parallelogram into two identical triangles.



The area of one triangle:

$$A = \frac{1}{2}bh$$

1) $A = \underline{\hspace{1cm}}$ sq. inches

The area of 2 triangles:

$$A = 2 \times \frac{1}{2} \times bh \text{ or } A = 1 \times bh$$

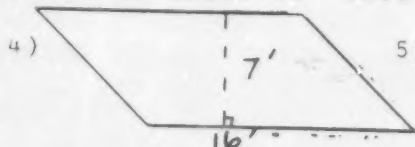
2) $A = \underline{\hspace{1cm}}$ sq. inches

Since the two triangles together make up the parallelogram, the area of any parallelogram is:

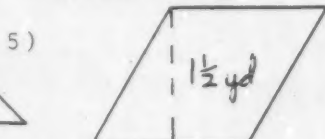
$$A = bh$$

3) In the parallelogram above, the base is 2" and the altitude is $1\frac{1}{2}$ ". Find the area. $A = b \times h$, $A = 2 \times 1\frac{1}{2} = \underline{\hspace{1cm}}$ sq. inches

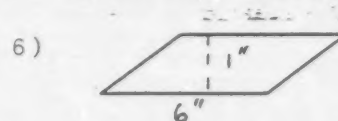
Find the areas of these parallelograms. Dotted lines show altitudes.



$A = \underline{\hspace{1cm}} \times \underline{\hspace{1cm}} = \underline{\hspace{1cm}}$



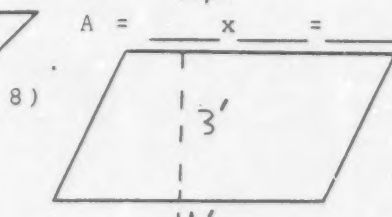
$A = \underline{\hspace{1cm}} \times \underline{\hspace{1cm}} = \underline{\hspace{1cm}}$



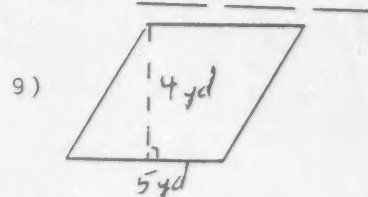
$A = \underline{\hspace{1cm}} \times \underline{\hspace{1cm}} = \underline{\hspace{1cm}}$



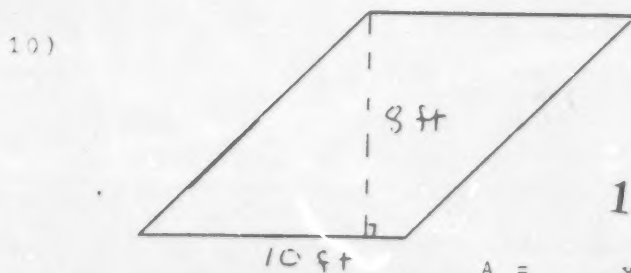
$A = \underline{\hspace{1cm}} \times \underline{\hspace{1cm}} = \underline{\hspace{1cm}}$



$A = \underline{\hspace{1cm}} \times \underline{\hspace{1cm}} = \underline{\hspace{1cm}}$



$A = \underline{\hspace{1cm}} \times \underline{\hspace{1cm}} = \underline{\hspace{1cm}}$

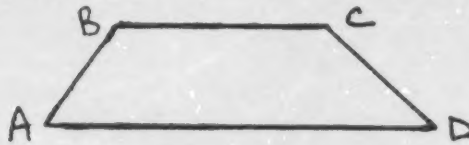


170

$A = \underline{\hspace{1cm}} \times \underline{\hspace{1cm}} = \underline{\hspace{1cm}}$

Trapezoids

A trapezoid has only one pair of parallel sides. These sides are called bases.



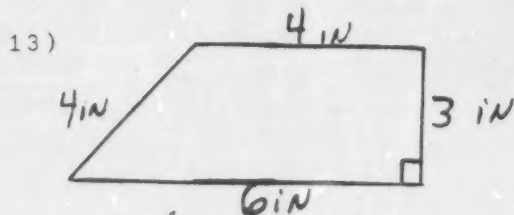
- 11) In figure ABCD, there is only one pair of parallel sides: $\overline{BC}$ and _____
- 12) This figure is called a _____.

The area of a trapezoid is equal to $1/2$ the product of the sum of its bases ($b_1 + b_2$) and its height

$$A = \frac{1}{2} (b_1 + b_2) h$$

$\frac{1}{2} (b_1 + b_2)$ = the average of the bases. So you can think of the area of a trapezoid as average of the bases times the height.

$$\frac{1}{2} (b_1 + b_2) \times h$$

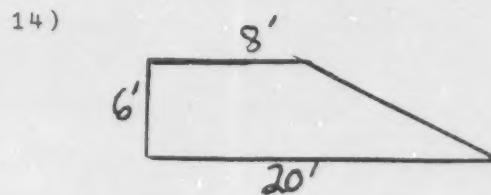


$$A = \frac{1}{2} (b_1 + b_2) h$$

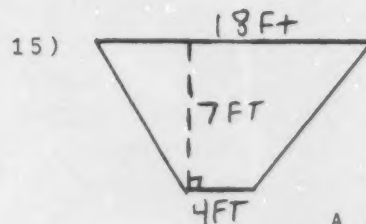
$$A = \frac{1}{2} (4 + 6) 3$$

$$A = \frac{1}{2} (10) 3$$

$$A = \underline{\hspace{2cm}} \text{ sq. inches}$$



$$A = \underline{\hspace{2cm}} \text{ sq. ft.}$$



$$A = \underline{\hspace{2cm}} \text{ sq. ft.}$$

Find the area of trapezoid described below.

<u>bases</u>	<u>height</u>	<u>areas</u>
16) 3 in., 4 in.	7 in.	_____ sq. in.
17) 1 yd., 3 yd.	2 yd.	_____ sq. yd.
18) 10 ft., 20 ft.	2 ft.	_____ sq. ft.

PERIMETER AND AREA U- 8

Name _____ Period _____ Date _____

Objective: You will be able to find the area of circles.

To find the area of a circle we use the Formula: $A = \pi \times r \times r$ or $A = \pi r^2$



Example I $A = \pi r^2$ (Use $\pi = 3.14$)

$r = 7"$ $A = 3.14 \times 7 \times 7$

$A = 3.14 \times 49$

$A = 153.86$ square inches.

Example II (Radius is 7 in.)

$A = \pi r^2$ (Use $\pi = \frac{22}{7}$)

$A = \frac{22}{7} \times 7 \times 7$

$A = 154$ sq. inches

Both answers in example I and example II are approximate since π is not exactly 3.14 or exactly $\frac{22}{7}$.

Given a circle with its radius 6 cm, find its Area. Fill in the missing parts.

(1) $A = \pi r^2$ (Use 3.14 for π) or (2) $A = \pi r^2$ (Use $\pi = \frac{22}{7}$)

$A = 3.14 \times 6 \times$ _____

$A =$ _____ $\times$ _____ $\times$ _____

$A = 3.14$ _____

$A = \frac{22}{7} \times$ _____

$A =$ _____ sq. cm

$A =$ _____ sq. cm

Find the Areas of these Circles with the radii or diameters given:

(3) $r = 1.6$ ft.

$A = \pi r^2$

$A = 3.14 \times 1.6 \times 1.6$

$A = 3.14 \times$ _____

$A =$ _____

(4) $r = \frac{D}{2}$

$D = 4$ m (Use $\pi = \frac{22}{7}$)

$A = \pi r^2$

$A = \frac{22}{7} \times$ _____ $\times$ _____

$A =$ _____ sq. m

(5) $r = 14 \text{ in.}$

$A = \pi r^2$

$A = \underline{\hspace{1cm}} \times \underline{\hspace{1cm}} \times \underline{\hspace{1cm}}$

$A = \underline{\hspace{1cm}} \times \underline{\hspace{1cm}}$

$A = \underline{\hspace{1cm}}$

(6) $D = 2.4 \text{ cm}$

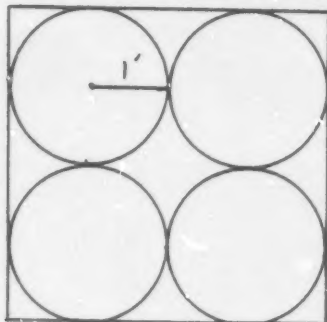
$r = \underline{\hspace{1cm}}$

$A = \pi r^2$

$A = \underline{\hspace{1cm}} \times \underline{\hspace{1cm}}$

$A = \underline{\hspace{1cm}}$

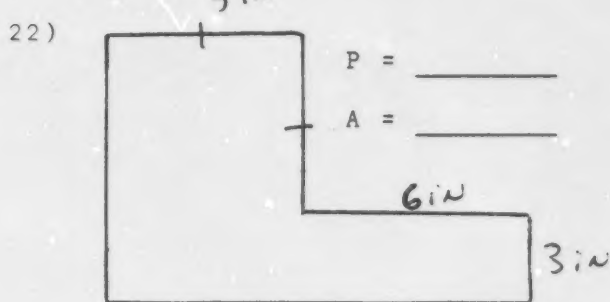
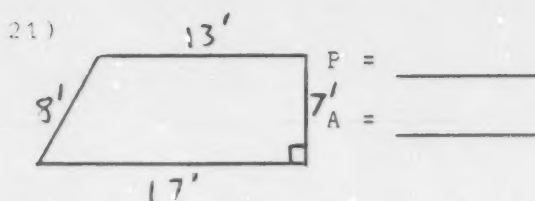
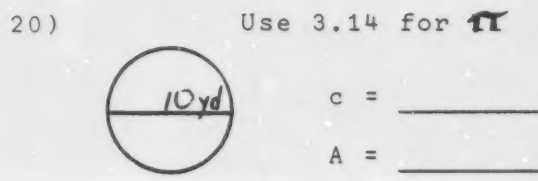
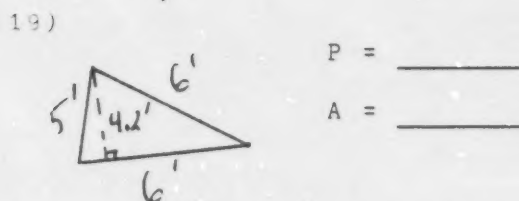
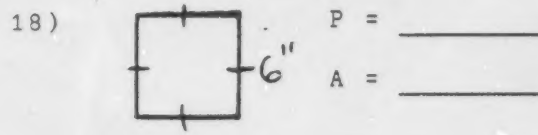
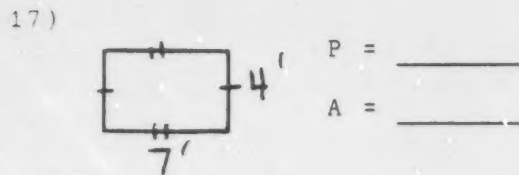
Area of a circle = πr^2

(7) Find the area of a circle whose radius is 7'. $\underline{\hspace{2cm}}$. (Use $\frac{22}{7}$ for π)(8) Find the area of a circle whose diameter is 6". $\underline{\hspace{2cm}}$.
(Use 3.14 for π)(9) The area of a circle is 314 sq. ft. What is the radius? $\underline{\hspace{2cm}}$
(Use 3.14 for π)What is the diameter? $\underline{\hspace{2cm}}$ (10) Four circular discs are cut from a sheet of plywood. How much plywood is waste?
 $\underline{\hspace{2cm}}$. (Use $\frac{22}{7}$ for π)

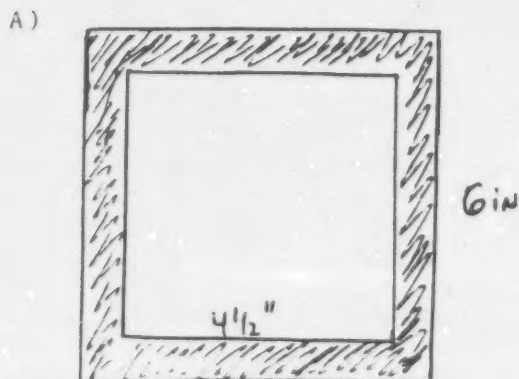
Review: Match the formula for each area of a

- 11) _____ Rectangle
 12) _____ Parallelogram
 13) _____ trapezoid
 14) _____ triangle
 15) _____ square
 16) _____ circle

- a) $A = b \times h$
 b) $A = \pi r^2$
 c) $A = 1/2 (b_1 + b_2) h$
 d) $A = s^2$
 e) $A = 1/2 (b \times h)$
 f) $A = l \times w$



Bonus: Area of the shaded part



A = _____

LEVEL U Checkpoint 5-8

Name _____

Period _____

Perimeter and Area

Date _____

MATCHING (use correct letter)

Match area formulas to figures named

_____ 1) triangle (U-5,6)

a) $A = \frac{1}{2} (b_1 + b_2) h$

_____ 2) Trapezoid (U-7)

b) $A = \frac{1}{2} b h$

_____ 3) Parallelogram (U-7)

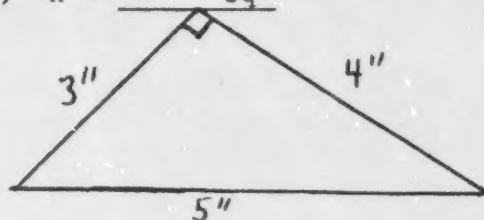
c) $A = \pi r^2$

_____ 4) Circle (U-8)

d) $A = b h$

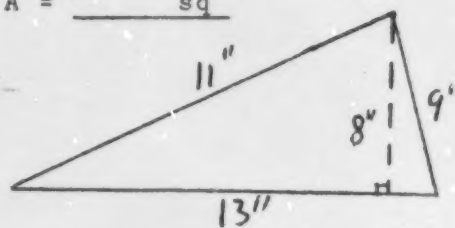
FIND THE AREA OF THE FIGURES DRAWN AND NAMED BELOW

5) $A = \frac{1}{2} b h$



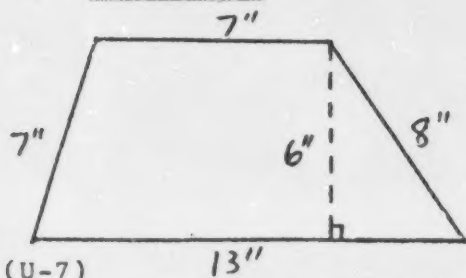
(U-5)

6) $A = \frac{1}{2} b h$



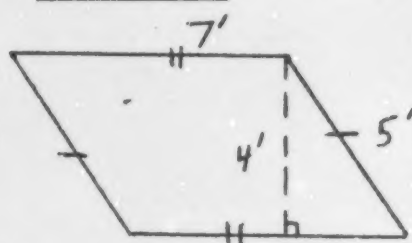
(U-6)

7) $A = \frac{1}{2} (b_1 + b_2) h$



(U-7)

8) $A = b h$



(U-7)

9) Circle with a radius of 4"

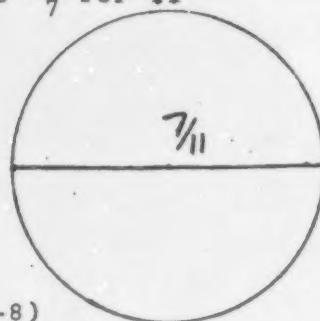
Use 3.14 for π

$A = \pi r^2$

(U-8)

10) $A = \pi r^2$

use $\frac{22}{7}$ for π



(U-8)

MATCHING (use correct letter)
Match area formulas to figures named

_____ 1) Triangle (U-5,6)

a) $A = \pi r^2$

_____ 2) Trapezoid (U-7)

b) $A = \frac{1}{2} (b_1 + b_2) h$

_____ 3) Parallelogram (U-7)

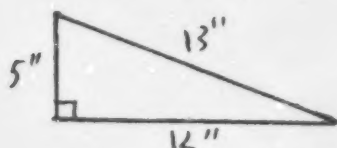
c) $A = \frac{1}{2} b h$

_____ 4) Circle (U-8)

d) $A = b h$

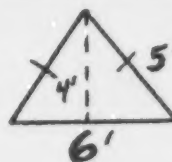
FIND THE AREA OF THE FIGURES DRAWN AND NAMED BELOW

5) $A =$ _____ sq"



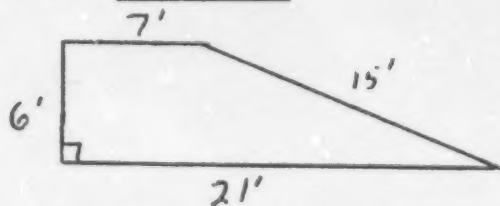
(U-5)

6) $A =$ _____ sq'



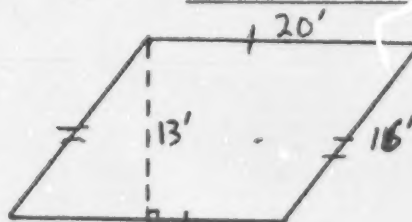
(U-6)

7) $A =$ _____



(U-7)

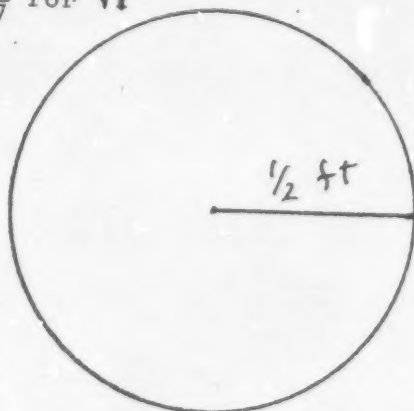
8) $A =$ _____



(U-7)

9) $A =$ _____

use $\frac{22}{7}$ for π



(U-8)

10) $A =$ _____

Circle with a diameter of 10 ft.

Use 3.14 for π

POSTTEST LEVEL U

PERIMETER AND AREA

NAME _____

PERIOD _____

DATE _____

1) The distance around a polygon is called the _____.

MATCHING (use correct letter)

Match perimeter formulas to polygons named

2) _____ Triangle

a) $p = 4s$

_____ Rectangle

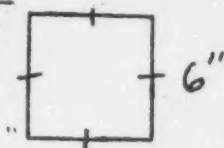
b) $p = a + b + c$

_____ Square

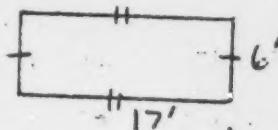
c) $p = 2 (l + w)$

FIND THE PERIMETERS OF THE FOLLOWING POLYGONS

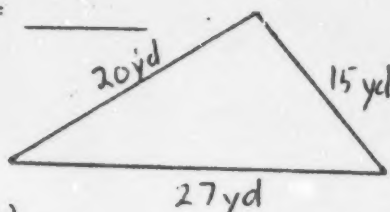
3) $p =$ _____



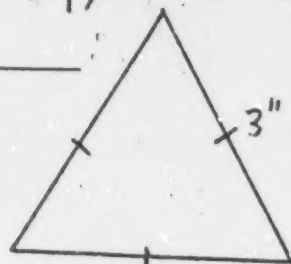
4) $p =$ _____



5) $p =$ _____

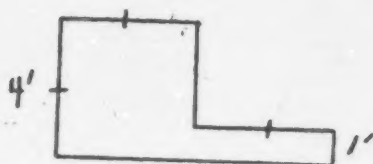


6) $p =$ _____

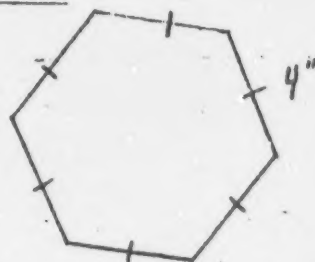


(U-1)

7) $p =$ _____



8) $p =$ _____



(U-2)

9) The distance around a circle is called the _____.

10) π has the same value for all circles. (True-False) _____

11) If the radius of a circle is 9 yards, what is the diameter?

(U-3)

FIND THE CIRCUMFERENCE OF THE CIRCLES DESCRIBED BELOW

12) $d = 7'$ use $\frac{22}{7}$ for π

$C = \underline{\hspace{2cm}}$

(U-3)

13) $r = 3''$ use 3.14 for π

$C = \underline{\hspace{2cm}}$

MATCHING (use correct letter) Match area formulas to figures named.

14) Square (U-4)

 Rectangle (U-4)

15) Triangle (U-5,6)

 Circle (U-8)

16) Trapezoid (U-7)

 Parallelogram (U-7) f) $A = \pi r^2$

a) $A = \frac{1}{2} b h$

b) $A = b h$

c) $A = \frac{1}{2} (b_1 + b_2) h$

d) $A = l w$

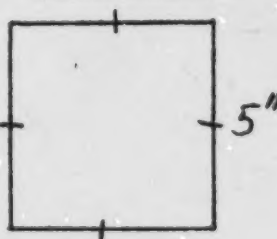
e) $A = s^2$

17) Area is measured in units. (Cubic or square)

FIND THE AREA OF THE FOLLOWING POLYGONS AND CIRCLES

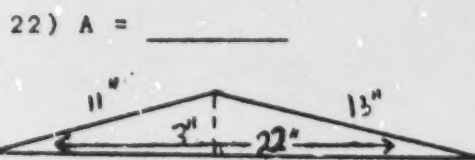
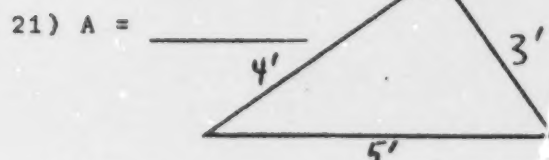
18) A square with a side of 9 inches. 19) $A = \underline{\hspace{2cm}}$ sq"

$A = \underline{\hspace{2cm}}$ sq"
(U-4)



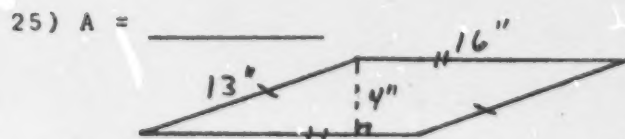
20) A rectangle with a length of 13" and a width of 6". $A = \underline{\hspace{2cm}}$

(U-4)



23) A triangle with a base of 10 feet and a height of 6 feet. $A = \underline{\hspace{2cm}}$
(U-5,6)

24) Area of a trapezoid with bases of 19 and 21 feet and a height of 6 feet. $A = \underline{\hspace{2cm}}$

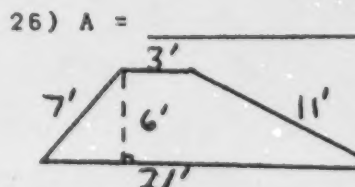


(U-7)

27) $r = \frac{1}{11}$, $A = \underline{\hspace{2cm}}$
use $\frac{22}{7}$ for π



29) $A = \underline{\hspace{2cm}}$
(U-8)



178

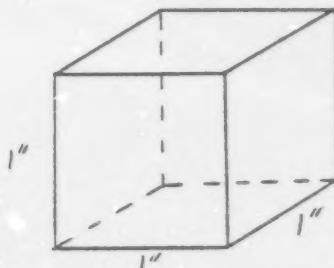
28) $d = 6'$, $A = \underline{\hspace{2cm}}$
use 3.14 for π



30) $A = \underline{\hspace{2cm}}$

Name _____ Date _____ Period _____

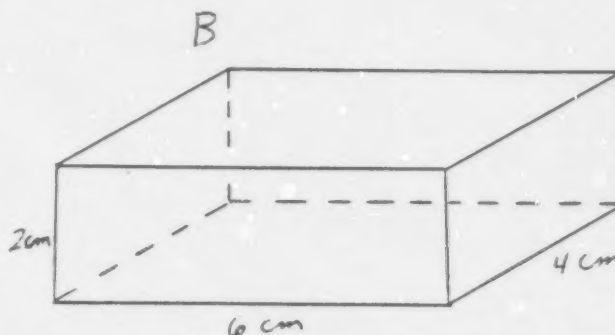
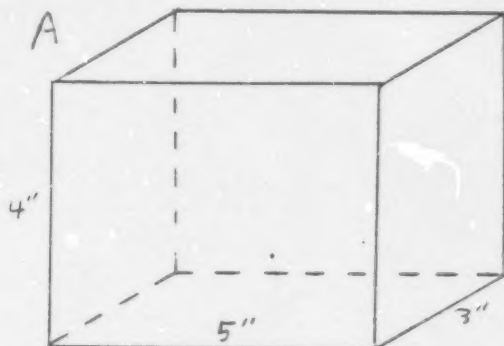
Objective: You will be able to find the volume of a rectangular solid.



Shown above is a diagram representing a one inch cube. This cube measures 1 cubic inch of volume and will occupy 1 cubic inch of space.

- (1) how many faces does a cube have? _____
- (2) What is the shape of each face? _____.
- (3) Measure each side of each face. Are all sides the same measure? _____
- (4) Some other units used to measure volume are the cubic foot, cubic yard, and cubic mile, as well as cubic centimeter, cubic meter and cubic kilometer. Which is the greater, the cubic foot or the cubic yard? _____.

Finding the volume of a rectangular solid involves finding how many of these cubic units can fit into the space occupied by the solid.



Rather than count the number of cubes that a solid can hold, a formula is used. One face of the solid is taken as the base. The distance on a perpendicular from that base to the side parallel to the base is called the height.

- (5) In figure A above if the base measures 3×5 , what is the measure of the height?

- (6) In figure B, the base measures 4×6 What is the measure of the height? _____
- (7) Recall from the lessons on area that the area of a rectangle can be found by multiplying length times width. What is the area of the base if figure A?

- (8) What is the area of the base in figure B? _____

The volume of a rectangular solid is found by multiplying the area of the base by the height.

As a formula this is written as $V = Bh$ or $V = L \times W \times H$.

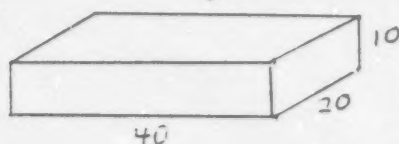
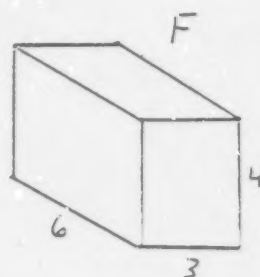
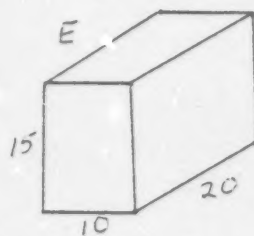
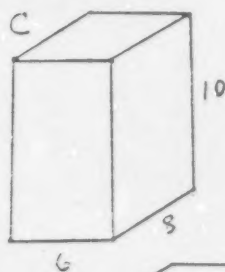
(9) The area of the base in fig. A is _____.

The height in Fig. A is _____.

The volume is _____ $\times$ _____ = _____ cubic inches.

(10) The area of the base in figure B is _____.

The height in fig. B is _____. The volume is _____ $\times$ _____ = _____



(11) Area of base in fig. C = _____ $\times$ _____ = _____. Volume of fig. C = _____ $\times$ _____ = _____.

(12) Area of fig. D = _____ $\times$ _____ = _____ Volume of D = _____ $\times$ _____ = _____

(13) Area of E = _____ $\times$ _____ = _____. Volume of E = _____ $\times$ _____ = _____

(14) Area of base in fig. F = _____ $\times$ _____ = _____

Volume of fig. F = _____ $\times$ _____ = _____

(15) The area of the base in fig. G = _____ $\times$ _____ = _____

The volume of fig. G = _____ $\times$ _____ = _____

Find the volume of rectangular solids with the given dimensions.

(16) Length 5 m. Width 9 m. Height 2 m.

(17) Length 7 cm. Width 6 cm. Height 4 cm.

(18) Length 7 yd. Width 7 yd. Height 12 yd.

(19) Length 3 ft. Width 2 ft. 6 in. Height 2 ft.

(20) Length 7 km. Width 3 km. Height 7 km.

(21) Which box full of Hershey Bars would you rather have? Box A, which measures 12 in. long, 11 in. wide and 8 in. high or Box B which measures 9 in. high, 11 in. wide and 10 in. high? _____

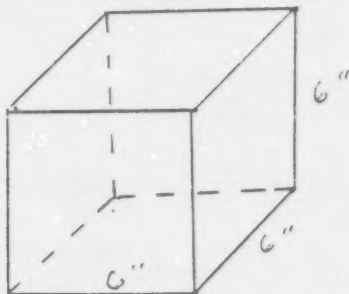
(22) Box number 1 is 16 cm. long, 17 cm. wide and 3 cm. high.

Box number 2 is 13 cm. long, 7 cm. wide and 9 cm. high.

Which box holds more pieces of bubble gum? _____

Name _____ Period _____ Date _____

Objective: you will be able to find the volume of a cube.



A cube is a special type of rectangular solid. It is special because the width, length and height of a cube are equal in length. The cube above has dimensions of length 6", width 6", and height 6".

Below are listed the dimensions of certain rectangular solids. If the rectangular solid is a cube, put yes in the blank. If it is not a cube, put no in the blank.

(To be a cube, the length, width, and height must be equal.)

Yes or No

- | | |
|--|------------|
| (1) length 3 in., width 3., height 3 in. | <u>yes</u> |
| (2) length 4 cm., width 4 cm., height 5 cm. | _____ |
| (3) length 7 yds., width 6 yds., height 7 yds. | _____ |
| (4) length 441 in., width 441 in., height 441 in. | _____ |
| (5) length $7\frac{1}{2}$ meters, width $7\frac{1}{2}$ meters, height 7 meters | _____ |
| (6) length 62 yds., width 52 yds., height 63 yds. | _____ |
| (7) length 112 ft., width 112 ft., height 11.2 ft. | _____ |

The formula for volume of a cube is the same as the formula for volume of a rectangular solid.

volume = area of base x height

or $V = Bh$ or $L \times W \times H$

- (8) Take the cube with dimensions length 6", width 6". height 6". Now find the volume.

First we find the area of the base. Area of base = length x width = $6 \times 6 =$ _____

$V = Bh$

- (9) So $V = 36 \times 6 =$ _____.

- (10) The volume of this cube ($6" \times 6" \times 6"$) = _____.

First find the area of the bases of the following cubes.

- | | | | |
|----------------------------|-----------------------|-----------------------|-------------------|
| (11) L = 7 in. | w = 7 in. | h = 7 in. | <u>49 sq. in.</u> |
| (12) L = 12 ft. | w = 12 ft. | h = 12 ft. | _____ |
| (13) L = 4 m. | w = 4 m. | h = 4 m. | _____ |
| (14) L = 8.2 cm. | w = 8.2 cm. | h = 8.2 cm. | _____ |
| (15) L = $\frac{2}{9}$ ft. | w = $\frac{2}{9}$ ft. | h = $\frac{2}{9}$ ft. | _____ |

Now find the volume of the following cubes.

(16) L = 9 in.	w = 9 in.	h = 9 in.	<u>729 cu. in.</u>
(17) L = 11 cm.	w = 11 cm.	h = 11 cm.	<u>CC</u>
(18) L = 3 yds.	w = 3 yds.	h = 3 yds.	<u> </u>
(19) L = 11 cm.	w = 11 cm.	h = 11 cm.	<u> </u>
(20) L = 6 cm.	w = 6 cm.	h = 6 cm.	<u> </u>

(21) Since the length, width and height are equal in a cube, we can refer to any one of these as an edge or side of the cube. Thus, if we have a cube whose edge = 2 in., then the length = 2 in., the width = and height =

(22) Find the volume of a cube whose edge = 2 in. $V = Bh$ or $L \times W \times H$ (area of base $\times$ height) or ((length $\times$ width) $\times$ height)

Area of base or $B = L \times W = 2 \times 2 =$

$V = Bh = 4 \times 2 =$

Volume of cube whose edge is 2 in. =

Find the area of the base, then the volume from the following cubes:

	<u>Area of Base</u>	<u>Volume</u>
(23) Edge = 3 cm.	<u>9 sq. cm.</u>	<u>27 cu. cm.</u>
(24) Edge 7 ft.	<u> </u>	<u> </u>
(25) Edge 12 yds.	<u> </u>	<u> </u>
(26) Edge = $\frac{1}{2}$ ft.	<u> </u>	<u> </u>
(27) Edge = 1 m.	<u> </u>	<u> </u>
(28) Edge = 100 in.	<u> </u>	<u> </u>

Let's call the edge of a cube S . Volume or $V = Bh$ and Area of base or $B = LW$

Let's substitute an S wherever we have L , W , or H since the edge of a cube equals, the length, the width, or the height.

In that case, if Area of base or $B = lw$, then $B = s^2$

Volume or $V = Bh$ so $V = s^2 \times s$
 $V = s^3$

Use this formula below.

(29) If a cube has an edge of 2 cm., find the volume. $V = s^3$ so

$V = 2 \times 2 \times 2 =$ cu. cm.

(30) A cube has an edge of 5 ft. Find the volume.

(31) A cube has an edge of 3 cm. Find the volume.

(32) Suppose we knew the volume of a cube and wanted to find the edge. If a cube has a volume of 8 cubic inches how long is the edge?

$$V = s^3$$

$$8 = s^3$$

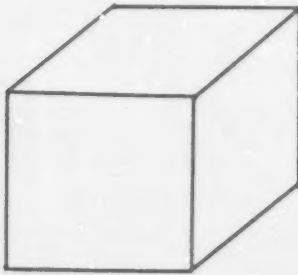
$$8 = s \times s \times s$$

$8 = 2 \times 2 \times$ The edge of this cube = . If you said 2 in, you are correct.

(33) Volume of a cube = 27 cu. ft. Find the edge.

Name _____ Period _____ Date _____

Objective: You will be able to compute the surface area of a cube and rectangular prisms.



Surface Area of a Cube

If you were to paint this cube on all six faces, which are the same size, you would cover what is called the surface area.

- (1) The area of one of the faces of the cube above is $e \times e$ or e^2 . The area of all six faces will be $6 \times \underline{\hspace{1cm}} \times \underline{\hspace{1cm}}$ or $6 \cdot e^2$.
- (2) $A = 6 \times e \times e$ or $A = 6e^2$ is the formula for the surface area of a .
- (3) Find the surface area of a cube where each side (e) is 3".

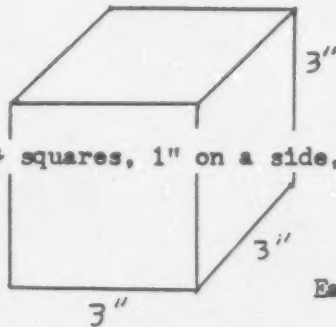
$$A = 6 \times e \times e$$

$$A = 6 \times (3 \times 3)$$

$$A = 6 \times 9$$

$$A = 54 \text{ sq. in.}$$

This means that it will take 54 squares, 1" on a side, to cover a cube inches on each edge.



Each face will have sq. in.

Find the surface area of these cubes with the edges (e) given.

Cubes

e	Area
3"	
5 cm.	
$\frac{1}{2}$ ' (ft)	
2.1 cm.	

Surface area of a rectangle prism.



rectangle prism

- (4) Are all the faces the same size as in the cube?
- (5) Are the faces on each end the same size?
- (6) Are the top and bottom faces the same size?

- (7) Are the two side faces the same size? _____
- (8) To find the area of each of the end faces, we can multiply $w \times h$. The area of both end faces will be _____ $\times (w \times h)$.
- (9) To find the area of the top or bottom face, we can multiply $l \times w$. The area of both the top and bottom faces will be _____ $\times (l \times w)$.
- (10) To find the area of each side face, we can multiply $l \times$ _____.
The area of both side faces will be _____ $\times (l \times h)$.
- (11) Finding the surface area of the entire prism, we have
 $A = (2 \times w \times h) + (2 \times l \times w) + (2 \times l \times h)$

Find the surface area of these rectangular prisms with dimensions that

Example: $A = (2 \times w \times h) + (2 \times l \times w) + (2 \times l \times h)$

$$A = 2 \times 3 \times 2 + 2 \times 4 \times 3 + 2 \times 4 \times 2$$

$$A = 12 + 24 + 16$$

$$A = 52 \text{ sq. in.}$$

	L	W	H	Area
	4"	3"	2"	52 sq. in.
(12)	8 m.	6 m.	4 m.	
(13)	4.2'	3.2'	2.2"	
(14)	10 cm.	8 cm.	7 cm.	

- (15) Which figure has more surface area: A 4-inch cube or a rectangle whose width is 9" and whose length is 11" ? The _____ has more surface area by _____ square inches.
- (16) What is the length of one edge of a cube whose total surface area is 864 square centimeters?
- (17) What is the surface area of the gym at Hillview? It is 30' high, 40' wide and 90 feet long. Include roof and floor.

Name _____ Period _____ Date _____

Objective: You will be able to find the volume of rectangular pyramids.

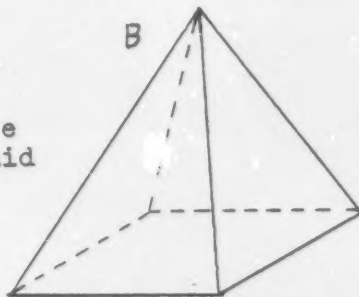
If a solid has a polygon shaped base and all other sides are triangular, the solid is called a pyramid.

Here are 3 common pyramids.

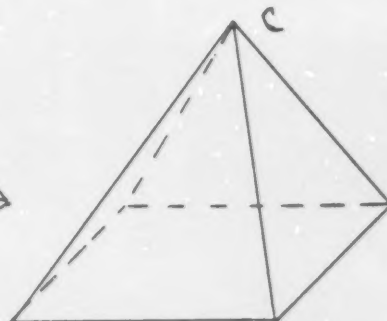
Triangular
Pyramid



Square
Pyramid



Rectangular
Pyramid

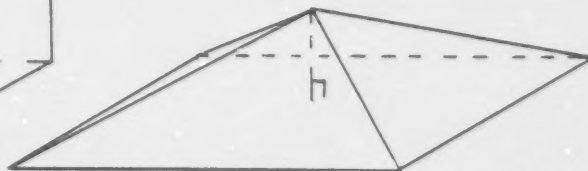
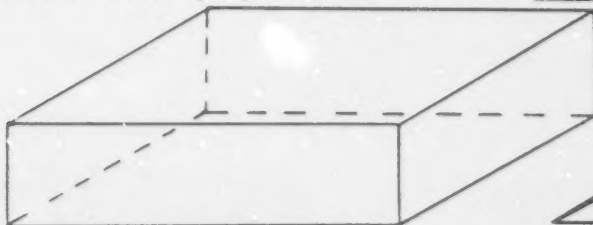


Pyramids are named for the shape of the base.

- (1) The base of figure A is a _____.
- (2) The base of figure B is a _____.
- (3) The base of figure C is a _____.

The point where the triangles come together is called the apex.

The distance on a perpendicular from the base to the apex is called the height.



The picture on the left is that of a rectangular solid. The picture on the right is that of a rectangular pyramid. It is a pyramid with a rectangular base.

- (4) Do you remember how to find the volume of a rectangular solid? _____
- (5) Suppose the rectangular solid on the left measures 5 in. in length, 4 in. in width and 3 in. in height. What is the volume. _____

If you said 60 cu. in., you are correct because

$$\text{Volume} = \text{AREA OF BASE} \times \text{HEIGHT}$$

$$V = (4 \times 5) \times 3$$

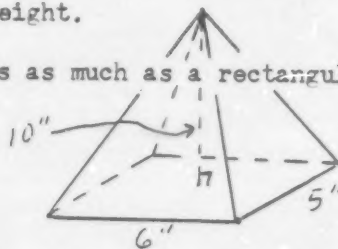
$$V = 60 \text{ cu. in.}$$

- (6) If the rectangular pyramid above had the same base and the same height as the rectangular solid, you could empty 3 pyramids full of water into the rectangular solid. That means that the rectangular solid holds _____ times as much as the pyramid.
- (7) If the rectangular solid holds 3 times as much as the rectangular pyramid, and if the rectangular solid has a volume of 60 cu. in., the rectangular pyramid would have a volume of _____ cu. in.

If you said 20 cu. in., you are correct because $\frac{1}{3} \times 60 = 20$.

Since the volume of a rectangular solid = Area of Base x Height, the volume of a rectangular pyramid = $\frac{1}{3} \times$ Area of Base x Height.

(Remember a rectangular solid holds 3 times as much as a rectangular pyramid of the same base and height).



A pyramid with a rectangular base (see picture above) has these dimensions: length 6 inches, width 5 inches, and the height of the pyramid is 10 inches Find the volume.

The formula is Volume = $\frac{1}{3} \times$ Area of base x Height or $V = \frac{1}{3} Bh$

(8) Since $B =$ length x width, the base = $5 \times 6 =$ _____.

(9) Volume, then = $\frac{1}{3} \times 30 \times 10 =$ _____.

Now you try some.

(10) The dimensions of a rectangular pyramid; length 4 m., width 6 m. height 7 m. Find the volume. _____

(11) In a rectangular pyramid, the dimensions of the base are length 9 in. and width 4 in. What is the area of the base? _____

(12) If the height of this pyramid is 12 in., what is the volume? _____

(13) A pyramid in Egypt has a base that measures 40 yds. in length and 20 yds. in width. If the height is 30 yds., what is its volume? _____

Complete the following chart for these rectangular pyramids:

(Remember: $V = \frac{1}{3} Bh$ and $B = Lw$)

	Length	Width	Height	Area of Base	Volume
(14)	6 cm.	5 cm.	7 cm.	30 sq. cm	70 cu. cm.
(15)	4 ft.	7 ft.	9 ft.	28 sq. ft.	_____ cu. ft.
(16)	10 m.	20 m.	30 m.	_____ sq. m.	2000 cu. m.
(17)	9 ft.	7 ft.	6 ft.	_____ sq. ft.	_____ cu. ft.
(18)	12 in.	6 in.	6 in.	_____ sq. in.	_____ cu. in.
(19)	25 yd.	10 yd.	30 yd.	_____	_____
(20)	2.1 cm.	3.0 cm.	3.0 cm.	_____	_____
(21)	$\frac{1}{2}$ ft.	$\frac{1}{4}$ ft.	$\frac{1}{3}$ ft.	_____	_____

(22) A rectangular solid holds _____ times as much as a rectangular pyramid with the same base and height. (23) The formula for the volume of a rectangular solid is $V =$ _____.

(24) The formula for the volume of a rectangular pyramid is $V =$ _____

LEVEL V CHECKPOINT 1-4

Name _____

Period _____

Date _____

Volume

1) Volume is measured in _____ units.

2) Find the volume of a rectangular solid with dimensions of length 15ft, width 10ft, and height 12 ft. $V =$ _____

3) Volume of a rectangular solid: $L = 6\text{cm}$ $W = 2\text{cm}$ $H = 5\text{cm}$
 $V =$ _____ cc

(V-1)

4) Find the volume of a cube with length 3", width 3" and height 3"
 $V =$ _____

5) Find the volume of a cube with an edge of 5 cm.

$V =$ _____ cc

(V-2)

6) Find the volume of a rectangular pyramid with $L = 6\text{in}$

$W = 6\text{in}$ $H = 9\text{in}$ Remember $V = \frac{1}{3}LWH$

$V =$ _____

7) Find the volume of a rectangular pyramid with $L = \frac{1}{2}$

$W = \frac{1}{3}$ $H = \frac{1}{2}$ $V =$ _____

(V-3)

8) Find the area of the base of a triangular pyramid with altitude of 3 cm and base of 6cm. Remember: $A = \frac{1}{2}bh$

Area = _____ sq. cm.

9) Find the volume of the triangular pyramid in problem 8 the height is 6 cm. Remember: $V = \frac{1}{3}bh$ $V =$ _____

10) The volume of a triangular pyramid is 42 cu ft. If the area of the base is 18 sq. ft., find the height.

$H =$ _____ feet

(V-4)

Name _____

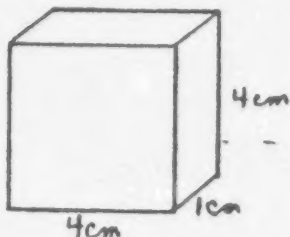
Period _____

Date _____

Volume

- 1) Find the volume of a rectangular solid with dimensions of
 $L = 16$ feet $H = 12$ feet and $W = 10$ feet. $V =$ _____

2)

 $V =$ _____ cc

(V-1)

Find the volumes of the following cubes.,

- 3) Edge of 4 inches

 $V =$ _____ cu. in.

- 4) Edge of 7 cm.

 $V =$ _____ cc

- 5) Edge of 9.3 ft.

 $V =$ _____ cu. ft.

(V-2)

- 6) Find the volume of a rectangular pyramid with
- $L = 8$
- in

 $W = 6$ in $H = 10$ in. Remember: $V = \frac{1}{3}LWH$ $V =$ _____ cu. in.

- 7) Find the volume of a rectangular pyramid
- $L = \frac{1}{4}$
- cm
- $W = \frac{1}{3}$
- cm

 $H = \frac{1}{6}$ cm $V =$ _____ cc

- 8) Find the area of a base of a triangular pyramid with altitude of 6 in and base of 12 in.. Remember:
- $A = \frac{1}{2}bh$

Area = _____ sq. in.

- 9) Find the volume of a pyramid with a height of 9 inches and the area of the base from problem 8. Remember
- $V = \frac{1}{3}bh$
- .

 $V =$ _____ cu. in.

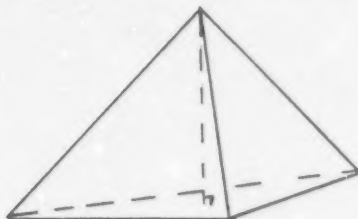
- 10) The volume of a triangular pyramid is 84 cu. ft. If the area of the base is 36 sq. ft., find the height.
- $V = \frac{1}{3}bh$
- .

 $H =$ _____ cu. ft.

(V-4)

Name _____ Period _____ Date _____

Objective: You will be able to find the volume of a triangular pyramid



This figure is a triangular pyramid. It is different from a square or rectangular pyramid because its base is a triangle. To find the volume we use the same formula:

$$V = \frac{1}{3} \text{ Area of Base } \times \text{ height}$$

$$\text{or } V = \frac{1}{3} Bh$$

- (1) The base of this pyramid is a triangle, so we must use the formula for the area of the triangle first. Do you remember it? _____

Area of a triangle = $\frac{1}{2}$ x altitude x base so the area of the base

becomes $B = \frac{1}{2} bh$.

- (2) Suppose the triangular pyramid above has a triangular base in which the altitude is 4" and the base is 7". Find the area of that triangular base. _____

If you said it is 14 sq. in., you are correct because:

$$\begin{aligned} \text{A of a triangle} &= \frac{1}{2} bh \\ &= \frac{1}{2} (7) (4) \\ &= 14 \text{ sq. in.} \end{aligned}$$

- (3) 14 sq. in. then is the area of the base of the triangular pyramid. Now suppose the height of the pyramid is 6". Find the volume of the pyramid _____

If you said 28 cu. in., you are correct.

$$\begin{aligned} V &= \frac{1}{3} \times \text{Area of base } \times \text{ height} \\ &= \frac{1}{3} (14) (6) \\ &= 28 \end{aligned}$$

A triangular pyramid has a base where the altitude is 4 m, the base of the triangle is 6 m., and the height of the pyramid is 7 m. Find the volume _____

- (4) First we find the area of the base. Area of the triangular base

$$\begin{aligned} &= \frac{1}{2} bh \\ &= \frac{1}{2} (6) (4) \\ &= \text{_____ sq. m.} \end{aligned}$$

(5) Then find the volume.

$$V = \frac{1}{3} \text{ area of base } \times \text{ height}$$

$$= \frac{1}{3} Bh$$

$$= \underline{\hspace{2cm}} \text{ cu. m.}$$

Find the areas of the bases of the following triangular pyramids. Then find the Volume.

Remember: $V = \frac{1}{3} Bh$ and Area of base or $B = \frac{1}{2} bh$

Base of Pyramid

	Altitude	Base	Area or B	Height of Pyramid or h	Volume of Pyramid or V
(6)	2 in.	4 in.	3 sq. in.	6 in.	6 cu. in.
(7)	5 ft.	10 ft.	25 sq. ft.	6 ft.	_____ cu. ft.
(8)	6 m.	6 m.	_____	3 m.	_____
(9)	10 cm.	20 cm.	_____	30 cm.	_____
(10)	$\frac{1}{2}$ ft.	$\frac{1}{4}$ ft.	_____	$\frac{1}{3}$ ft.	_____
(11)	2 yd.	3 yd.	_____	6.3 yd.	_____

- (12) The volume of a triangular pyramid is 6 cu. in. If the area of the base is 3 sq. in., find the height.

$$V = \frac{1}{3} Bh \quad \text{Substituting, we get}$$

$$6 = \frac{1}{3} (3)h$$

$$6 = 1h$$

$$h = \underline{\hspace{2cm}}$$

- (13) The volume of a triangular pyramid is 36 cu. yds. If the area of the base is 18 sq. yds., find the height. $H = \underline{\hspace{2cm}}$

Show work here

- (14) The volume of a triangular pyramid is 66 cu. ft. If the height is 6 ft., find the area of the base. $B = \underline{\hspace{2cm}}$

Show work here

Name _____ Period _____ Date _____

Objective: You will be able to find the volume of a right circular cylinder.

The cylinder has a base in the shape of a circle.



The most frequent use of the cylinder is the common tin can. We use volume to find out, for instance, how much water the can above might hold.

Again, we use the general formula for volume of a solid: $V = Bh$ (Area of base x height)

- (1) If the can above has a base whose area is 9 sq. in. and whose height is 6 in., find the volume. $V = Bh$

$$V = 9 \times 6 = \underline{\hspace{2cm}}$$

- (2) Suppose that we don't know the area of the base of a cylinder but we are told that its radius is 3 in. Can we find its area from this much information. _____

Yes we can because the base is a circle and the formula for the area of a circle is: Area or $B = \pi r^2$ (let $\pi = \frac{22}{7}$)

- (3) To find the area of this circle then, since $r = 3$ in., and

$$B = \pi r^2$$

$$B = \left(\frac{22}{7}\right) (3^2)$$

$$B = \left(\frac{22}{7}\right) (9) = \underline{\hspace{2cm}}$$

So the area of the base = $\frac{198}{7}$ or $28 \frac{2}{7}$ sq. in.

Let's practice finding the area of the bases of the following cylinders.

The radii of these bases are given. Let $\pi = \frac{22}{7}$

$$A = \pi r^2$$

- (4) $r = 7$ in.

$$B = \underline{\hspace{2cm}}$$

- (5) $r = 12$ m.

$$B = \underline{\hspace{2cm}}$$

- (6) $r = \frac{2}{3}$ ft.

$$B = \underline{\hspace{2cm}}$$

- (7) $r = 3$ cm.

$$B = \underline{\hspace{2cm}}$$

- (8) $r = 110$ yds.

$$B = \underline{\hspace{2cm}}$$

Now that you're an expert at finding the area of the bases, Let's put it all together and find the volume of some cylinders.

Find the volume of a cylinder whose base has a radius of 2 in. and whose height is 7 in.

$$V = Bh$$

Remember, B (area of base) = πr^2

(9) First we find B

$$B = \pi r^2$$

$$B = \left(\frac{22}{7}\right) (2^2)$$

$$= \left(\frac{22}{7}\right) (4) = \underline{\hspace{2cm}}$$

We find that $B = 12$ and $\frac{4}{7}$

(10) Now find V

$$V = Bh \text{ (or } \pi r^2 h \text{)}$$

$$= \left(12 \frac{4}{7}\right) (7) = \underline{\hspace{2cm}}$$

(11) Did you get 88 cu. in. for the volume?

That is the correct answer.

Fill in the following chart. First you must find the area of the base of the following cylinders; then you must find their volume.

$$V = Bh$$

$$B = \pi r^2 \quad \left(\text{Let } \pi = \frac{22}{7}\right)$$

	Radius of Base = r	Height = h	Area of Base = B	Volume = V
(12)	2 in.	7 in.	$12 \frac{4}{7}$ sq. in.	88 cu. in.
(13)	3 cm.	6 cm..	$28 \frac{2}{7}$ sq. cm.	$169 \frac{5}{7}$ cu. cm.
(14)	1 ft.	2 ft.	$3 \frac{1}{7}$ ft.	<u> </u> cu. ft.
(15)	4 m.	1 m.	<u> </u> sq. m.	<u> </u> cu. m.
(16)	5 in.	2 in.	<u> </u>	<u> </u>
(17)	$\frac{1}{2}$ ft.	$\frac{1}{2}$ ft.	<u> </u>	<u> </u>

Try these practical problems:

(18) A wastebasket in the shape of a cylinder has a base with a radius of 3 in. and a height of 8 in. Find its volume.

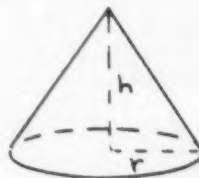
Show work here

(19) A can has a base whose radius is 20 cm. The height of the can is 30 cm. Find its volume.

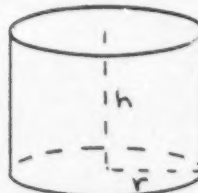
(20) Write down the formula for finding the area of the base of a cylinder.

Name _____ Period _____ Date _____

Objective: You will be able to find the volume of a cone.

The figure at the right is called a cone.

A cone is in some ways similar to a cylinder.



(1) Can you see how they are different? _____

To find the volume of a cylinder we used this formula:

$$V = Bh \text{ or } \pi r^2 h$$

If you had a cylinder and a cone which had the same base and the same height, you could empty 3 cones filled with water into the cylinder and the cylinder would be full.This means that the cylinder is 3 times as large as the cone or that the cone is $\frac{1}{3}$ as large as the cylinder. The formula then for volume of a cone is:

$$V = \frac{1}{3} Bh \text{ or } \frac{1}{3} \pi r^2 h$$

(2) Find the volume of a cone the area of whose base is 10 sq. in. and whose height is 12 in.

$$V = \frac{1}{3} Bh, \text{ so}$$

$$V = \frac{1}{3} (10) (12) = \underline{\hspace{2cm}}$$

Thus the volume of this cone = 40 cu. in.

Try these on your own. Find the volumes of these cones.

$$V = \frac{1}{3} Bh$$

	Area of Base	Height	Volume
(3)	2 sq. in.	6 in.	4 cu. in.
(4)	4 sq. ft.	9 ft.	_____ cu. ft.
(5)	$\frac{1}{7}$ sq. m.	7 m.	_____ cu. m.
(6)	11 sq. cm.	2 cm.	_____ cu. cm.

Sometimes you are told the radius of the base of the cone and you will have to find the area of the base yourself before you can find the volume.

(7) A cone has a base whose radius is 2 in. Find the area of its base.

$$B = \pi r^2 \text{ so, } B = \left(\frac{22}{7}\right) (2^2) = \left(\frac{22}{7}\right) (4) = \underline{\hspace{2cm}}$$

$$\text{thus, } B = \frac{88}{7} \text{ or } 12 \frac{4}{7}$$

If that same cone has a height of 7 in., find its volume.

$$V = \frac{1}{3} Bh$$

Since $B = \frac{88}{7}$ and $h = 7$

then $V = \frac{1}{3} (\frac{88}{7}) (7) = \underline{\hspace{2cm}}$

You should have gotten $V = \frac{88}{3}$ or $29 \frac{1}{3}$

Find the volume of the following cones after you have first found the area of their bases.

Remember!

$$V = \frac{1}{3} Bh \text{ or } \frac{1}{3} \pi r^2 h$$

and $B = \pi r^2$

let $\pi = \frac{22}{7}$

- (8) Radius = 3 cm. Height = 7 cm.

Radius x Radius or $r^2 = 3 \times 3 = \underline{\hspace{2cm}}$

πr^2 or $\frac{22}{7} \times \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$

$\frac{1}{3} \pi r^2 = \frac{1}{3} \times \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$

$\frac{1}{3} B \times h = \underline{\hspace{2cm}} \times \frac{7}{1} = \underline{\hspace{2cm}}$ cu. cm.

- (9) Radius 2 yd. Height 4 yd.

$r^2 = 2 \times 2 = \underline{\hspace{2cm}}$

$\pi r^2 = \frac{22}{7} \times \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$

$\frac{1}{3} \pi r^2 = \frac{1}{3} \times \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$

$\frac{1}{3} \pi r^2 \times h = \underline{\hspace{2cm}} \times 4 = \underline{\hspace{2cm}}$

- (10) Radius = 1 m. Height = 5 m.
Find volume.

- (11) Radius = 7 ft. Height = 6 ft. Find volume.

- (12) A cone has a base with radius 10 cm. and a height 14 cm. Find volume.

- (13) A cone has a radius of 5 yds. and a height of 6 yds. Find its volume.

- (14) A cylinder with the same base and height as a cone holds as much water as the cone.

Name _____ Period _____ Date _____

Objective: You will be able to find the volume of a sphere.



The space figure shown above is a sphere. Every point on the sphere is the same distance from a point called the center of the sphere. (Point O is the center above)

A round ball is in the shape of a sphere.

Can you name two other things in your everyday life that remind you of a sphere?

(1) _____

(2) _____

the radius of a sphere is the distance from the center to any point on the surface of the sphere. (Radius = r in the figure above.)

To find the volume of a sphere we use the following formula:

$$V = \frac{4}{3} \pi r^3$$

Remember: r^3 means $r \times r \times r$

$$V = \frac{4}{3} \pi r^3$$

Example:

(let $\pi = \frac{22}{7}$) If the radius of a sphere is 2 in.,

Find its volume.

$$(3) \quad V = \frac{4}{3} \pi r^3$$

$$= \frac{4}{3} \left(\frac{22}{7} \right) (2^3) = \frac{4}{3} \times \frac{22}{7} \times 2 \times 2 \times 2$$

$$= \left(\frac{4}{3} \right) \left(\frac{22}{7} \right) (8) = \underline{\hspace{2cm}}$$

(Your answer should have been $\frac{704}{21}$ or $33 \frac{11}{21}$.)

Find the volumes of the solid spheres having the following measurements:

(let $\pi = \frac{22}{7}$)

(4) $r = 3$ cm.

$V = \underline{\hspace{2cm}}$.

(show work here)

(5) $r = 4$ yds.

$V = \underline{\hspace{2cm}}$.

(6) $r = 7$ m.

$V = \underline{\hspace{2cm}}$.

- (7) How would you work this problem? The diameter of a sphere is 10 in. Find its volume.

$$V = \frac{4}{3} \pi r^3$$

We don't know the radius, but can we find the radius if we know the diameter? $\underline{\hspace{2cm}}$

- (8) If the diameter is 10 in., what is the radius? $\underline{\hspace{2cm}}$.

- (9) Since we now know that the radius = 5 in., find the volume.

$$V = \frac{4}{3} \pi r^3 = \left(\frac{4}{3}\right) \left(\frac{22}{7}\right) (5^3) = \underline{\hspace{2cm}}$$

Solve these problems.

- (10) Find the volume of a sphere whose diameter is 8 m. long. $V = \underline{\hspace{2cm}}$
(Show work)

- (11) The diameter of a ball is 7 in. Find its volume. $V = \underline{\hspace{2cm}}$

- (12) The diameter of a sphere is $\underline{\hspace{2cm}}$ times as long as its radius.

LEVEL V CHECKPOINT 5-8

Name _____

Period _____

Date _____

Volume

Matching: Use the correct letter to identify the formula for each.

Volume of a:

- _____ 1) Cone
 _____ 2) Sphere
 _____ 3) Rectangular Pyramid
 _____ 4) Triangular Pyramid
 _____ 5) Cylinder
 _____ 6) Rectangular Prism

- a) $V = \frac{4}{3} \pi r^3$
 b) $V = \frac{1}{3}(\frac{1}{2}bh)H$
 c) $V = \frac{1}{3} Lwh$
 d) $V = \pi r^2 h$
 e) $V = \frac{1}{3} \pi r^2 h$
 f) $V = Lwh$

Find the folume of the following solids. (use $\frac{22}{7}$ for π)
Show your work.

7) Triangular pyramid

$b = 4''$ $h = 3$ $H = 6''$

$V =$ _____

8) Right circular cylinder

$r = 7''$ $h = 6''$

$V =$ _____

(V-5)

9) Cone

$r = 1''$ $h = 9''$

$V =$ _____

(V-6)

10) Sphere

$r = 2''$

$V =$ _____

Name _____

Period _____

Date _____

Volume

Matching: Use the correct letter to identify the formula for each.

Volume of a:

- | | |
|----------------------------------|--------------------------------------|
| _____ 1) Sphere | a) $V = \frac{1}{3}(\frac{1}{2}bh)H$ |
| _____ 2) Rectangular pyramid | b) $V = \frac{4}{3}\pi r^3$ |
| _____ 3) Triangular pyramid | c) $V = \frac{1}{3}LWh$ |
| _____ 4) Right Circular Cylinder | d) $V = LWh$ |
| _____ 5) Cone | e) $V = \frac{1}{3}\pi r^2h$ |
| _____ 6) Rectangular Prism | f) $V = \pi r^2h$ |

Find the volume of the following solids. (use $\frac{22}{7}$ for π)
SHOW YOUR WORK BELOW

7) triangular pyramid

$$b = 3" \quad h = 2" \quad H = 5"$$

$$V = \underline{\hspace{2cm}}$$

(V-5)

8) Right circular cylinder

$$r = \frac{1}{2}" \quad h = 4"$$

$$V = \underline{\hspace{2cm}}$$

(V-6)

9) Cone

$$r = 3" \quad h = 6"$$

$$V = \underline{\hspace{2cm}}$$

(V-7)

10) Sphere

$$r = \frac{1}{2}"$$

$$V = \underline{\hspace{2cm}}$$

(V-8)

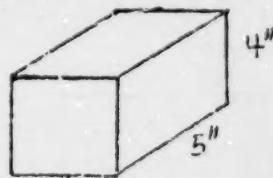
VOLUME LEVEL V
POST TEST

Name _____
Period _____
Date _____

- (1) Volume is measured in _____ units. (V-1)
(2) A rectangular solid has _____ faces. (V-1)
(3) Give the volume of the solid shown below. $V =$ _____ (V-1)



- (4) A rectangular solid has a base $2\frac{1}{2}$ " by 6" and a height of 5".
Give volume. _____ (V-1)
(5) A cube has _____ faces. (V-2)
(6) Each face of a cube is in the shape of a _____. (V-2)
(7) Find the volume of a cube 2" on a side. $V =$ _____ (V-2)
(8) Find the volume of a cube 4" on a side. $V =$ _____ (V-2)
(9) The volume of the cube in problem 8 is _____ times the volume of the cube in #7. (V-2)
(10) The surface area of a 9" cube is _____. (V-3)
(11) Find the surface area of this drawing. _____ (V-3)



- (12) A rectangular pyramid has a base measuring 10' X 12' and a height of 15'.
Find the volume. _____ (V-4)
(13) A triangular pyramid has a base in the shape of a right triangle with legs 6" and 9". The height is 7". Give the volume. _____ (V-5)
(14) A cylinder has a base with a radius of 7" and height of 22". Give the volume.
 $V =$ _____ (V-6)
(15) A cone has a base with a radius of 9' and height of 11'. Give the volume.
 $V =$ _____ (V-7)
(16) A ball (sphere) has a radius of $3\frac{1}{2}$ ". Give the volume. $V =$ _____ (V-8)